THE CONDOR

A Magazine of Western Ornithology

Volume XXXIX July-August, 1937 Number 4

COOPER ORNITHOLOGICAL CLUB

THE CONDOR

A Magazine of Western Ornithology

Published Bi-monthly by the Cooper Ornithological Club
Entered as second-class matter May 15, 1925, at the post-office at Berkeley, California, under Act of Congress of February 28, 1925, Section 412, paragraph 4.
Issued from the Office of THE CONDOR, Museum of Vertebrate Zoology, Berkeley, California.

SUBSCRIPTION RATES

Three Dollars per Year in the United States, payable in advance.
Fifty Cents the single copy.
Three Dollars and Twenty-five Cents per Year in all other countries in the International Postal Union.

COOPER ORNITHOLOGICAL CLUB

Dues are payable in advance on January first for the calendar year: Three Dollars per year for members residing in the United States; Three Dollars and Twenty-five Cents in all other countries. Members whose dues are paid receive THE CONDOR without additional charge.

The Life Membership fee is Seventy-five Dollars. No additional dues are required, and the money is invested and the interest only is used for Club publications. Life Members receive The Condor without additional charge.

Send manuscripts for publication to the Editor, J. GRINNELL, Museum of Vertebrate Zoology, Berkeley, California, or to either of the Associate Editors, JEAN M. LINSDALE and ALDEN H. MILLER, same address.

Send dues and subscriptions to JOHN McB. ROBERTSON, Associate Business Manager, Buena Park, California; orders for back numbers of THE CONDOR and the PACIFIC COAST AVIFAUNA series to W. LEE CHAMBERS, Business Manager, 2068 Escarpa Drive, Eagle Rock, California.

Issued July 15, 1937

CONTENTS

THE CONDOR

VOLUME XXXIX JULY-AUGUST, 1937 NUMBER 4

A PET SPARROW HAWK

WITH FOUR ILLUSTRATIONS

By WRIGHT M. PIERCE

When one day last spring we discovered in our back yard a young male Sparrow Hawk (*Falco sparverius*), hardly able to fly, little did we realize how wonderful a pet we had acquired. This bird had been hatched in a nest that was in a high palm across the street, but now that he had fluttered out, even though his parents were quite near and must have heard the plaintive calls of their offspring, they paid no attention to the little fellow. He was full of life, and when I took hold of him, he scratched and bit and tried to escape.

Rather than keep the little hawk in a cage, we decided to put a string on each of his legs, these in turn attached to a longer cord, so that when the bird was tied outside he would be able to exercise without harming himself. We found this method satisfactory, especially with this Sparrow Hawk, for even when he gets tangled, if he does not

Fig. 40. A pet Sparrow Hawk "just looking."

free himself, he remains quiet and patiently awaits our coming to rescue him. He has become so adept on the string that he will turn in the air and climb back up the leash to a perch.

A pet Prairie Falcon that we had at the same time would cackle and become nervous and angry when he was tangled. The larger falcon seemed to blame us for his troubles and would scratch and bite viciously when we attempted to untangle him. Our Sparrow Hawk showed no fear of the larger bird, and the falcon did not appear to be interested in the smaller bird; however, we thought it best to keep them apart. If anything came around that frightened or bothered the Sparrow Hawk, he would always cackle angrily and the feathers on the back of his neck would stand up menacingly.

Since his rather inauspicious start, when he was so wild and fierce, our Sparrow Hawk has become very tame and so gentle that we all love him for his little mannerisms. At first we had to force food into his beak, but it was only a short time until he was well able to feed himself. Now he is tied outside most of the time. Here he watches everything that comes near, especially the birds, and even though the jays scold him from a distance of a few feet, he seems not to be afraid, but just keeps his eyes on them and is only mildly interested. One day a pet jay was brought into the room with him. When placed near each other, the jay directed several vicious jabs at the hawk who in turn simply made an apparently rather feeble pass at his tormentor with his beak. This pass was not so gentle as it appeared, for it removed a surprisingly large number of feathers from the jay's back. The jay speedily departed and did not attempt to return.

The sight of the Sparrow Hawk is extremely keen. One day I noticed our bird, his head turned sidewise, intently staring into the sky. Close search on my part located a lazily soaring hawk, but so high that I could just distinguish it. He notices small insects at surprising distances if they are moving, but if they remain still, he often appears not to see them, even if they are quite near. During the first six months that we had our hawk he was offered water, both for drinking and bathing, but he would have nothing to do with it. The pet Prairie Falcon liked to bathe and we could not understand why the Sparrow Hawk acted this way, especially since we had known of other captive Sparrow Hawks that bathed regularly. On hot days, if he was in the sun, the bird opened his beak, panted, and seemed very uncomfortable. I showered him with the hose several times, wetting him thoroughly, but he did not appreciate this at all. He then merely sat and shivered and let his feathers dry without attempting to hurry the operation by flapping his wings, as did the falcon.

When it rained, the bird was very much upset and would not calm down. Even when brought inside, he kept flapping his wings and trying to escape. However, after our bird was about six months old, he began to drink a small amount of water at rather infrequent intervals. He wanted to bathe, but seemed not to know how. Even now, when he is nearly a year old, he presents a comical picture as he sits in a pan of water, tipping up and down and plunging his head into the water. He always seems to want a bath at the most inappropriate times, either late in the evening or on cold cloudy mornings. He only gets partially wet and then sits on his perch, waiting for his feathers to dry, never hastening the drying by flapping his wings or fluffing his feathers as birds usually do. At these times he presents a truly disconsolate picture.

For food our hawk especially likes small chunks of raw beef. If he is very hungry, he cries piteously until we feed him. While eating he stands on the meat, holding it firmly with his talons as he pulls it apart with his sharp hooked beak (fig. 41). We still think that he enjoys his food best when it is fed to him in small bits by hand as

Fig. 41. Sparrow Hawk eating meat.

Fig. 42. Sparrow Hawk disturbed at its meal.

he sits on the back of his favorite chair in the kitchen. However, if hungry, he will eat heartily when away from home, in strange surroundings. When especially starved, he grabs the food with his talons, pulls it underneath him, fluffs out his feathers and spreads his wings until he appears to be about twice normal size (fig. 42). Then if he is bothered, he cackles, weaves from side to side, tries to bite his tormentors, or perhaps turns his back toward them with his head held low, all the while keeping his meat hidden. Or he may attempt to escape by flying with the food held either in his talons or beak. If there is a corner handy he makes for this, and sits there with his head down and feathers and wings outspread, completely covering and hiding his food. This is probably a habit carried over from his nest days, when he did this to keep his food from his hungry nest mates.

Beside raw beef, water insects, beetles, angle worms, daddy-long-legs, flies, moths, spiders, grasshoppers, mosquitoes, mice, and lizards are relished. When feeding, he usually grabs his prey with his talons and then either pulls it into small pieces or swallows it whole as fancy dictates, or perhaps depending upon how hungry he is or how much he is being bothered at the time. For instance, one day I gave him a small lizard; this he carefully pulled apart and swallowed bit by bit. Then I presented him with another lizard fully three inches long, and in one big gulp he swallowed this entire animal, head foremost. This fast swallowing act probably was performed because I attempted to take the food away from him. However, this lizard did not stay down long, for it was coughed up in a minute or so. He seems able, without much effort, to disgorge at any time he wishes.

Like my Prairie Falcon, the little hawk will have nothing to do with frogs, even though he may be hungry. He was only mildly interested in a small water snake that I put near him, although the reptile showed extreme fear, thrashing about and striking at the bird and then crawling in great haste away as soon as possible. Seemingly the bird did not recognize the snake as food, but the reptile certainly realized its danger. Perhaps the results would have been different had the bird been hungry.

Our hawk does not seem to be particularly interested in birds for food, although he will eat English Sparrows and jays if I pull away the feathers, exposing the meat. If the bird is given more to eat than he wants, he carefully pokes the remainder under anything that may be handy, uttering low satisfied "quirks." He always seems quite proud of his ability to do this. After being outdoors all day he is always brought back to his perch in the house, whereupon he goes directly to his hidden food if he is hungry. This action of his would lead one to suspect that in the wild state these birds cache away any excess food they may have. I found several regurgitated pellets, about one-half inch in diameter. These are to be expected, because the hawk swallows many feathers from the birds and considerable hair from the mice that he eats.

It is interesting to note the reactions of this Sparrow Hawk to our small dog. When both are tied in the backyard near together, it appears that each enjoys the company of the other. Certain it is the bird has no fear of the dog. If the dog becomes too familiar, the hawk cackles and then viciously bites the dog's ear or nose, sometimes holding on for several seconds. Then at the first opportunity the bird flies to a higher perch. So far, the bird has never used his talons for defense against the dog.

At night the dog sleeps in a low open box in the house. Once I put the bird on the floor near the box, and the puppy raised up and saw the bird possibly a foot away. Meanwhile the hawk had flattened himself out, with wings outspread, and was intently staring at the dog, all the time weaving from side to side much as a Barn Owl would do if disturbed in the day time. Tiring of these play stunts, the bird straightened up, cackled and then deliberately flew and lit on the dog's head, where he stood for a short

time and then flew to a higher perch. The dog has a habit of putting his paws rather roughly on the bird, who always cackles angrily at this and then flies to a place out of reach. But when a strange dog or a wandering cat comes into the yard, the hawk at once tells about it with shrill, loud, angry cackles. One day a stray cat came too near and we heard our bird cackling angrily. Going to him, we found him much excited, with his talons full of fur and the cat watching him from a distance. The hawk apparently fears nothing, and would probably have met with disaster had we not been near.

A vacation at our mountain cabin did not seem to bother the bird at all. Every night we put him on a stick of wood on the table in the living room. Here he sat intently watching our every action, turning his head from side to side, or fluffing up his feathers and preening each in turn with his beak. Then perhaps he would yawn, fluff up his feathers, stand on one leg, pull his head down on his shoulders until it was nearly hidden, close his eyes, and nap for ten or fifteen minutes. After that he would wake up, yawn a time or two, stretch himself in a satisfied way, and fly down onto the table to jump about, here and there, with gay abandon. This coming to the table was always a signal that he was ready for his play time, which lasted for a half hour or more. If a moth or other insect chanced to fall on the table, the hawk quickly jumped toward it and with startling speed grabbed the prey in his talons. It was almost unbelievable how tiny an insect he could hold in his talons, for many times he caught mosquitoes and tiny flies and held them until ready to eat them. As long as we remained, the hawk was perfectly content to stay there too, but he became nervous the moment we left and would seek a higher perch.

At our mountain cabin he had his sleeping quarters in a box in our bedroom. He never disturbed us after he was put to bed, but if we happened not to arise at the regular time, we would often hear him walking about; he rightly thought that it was time for breakfast. In true sleeping position he stands on one foot, with the other drawn up under his feathers, and pulls in his head until it is completely hidden in his fluffed feathers. I have only found him in this position once or twice, and then always at night; for when he dozes in the daytime he merely pulls his head low on his neck and closes both eyes, with no attempt at covering his head.

He seems to prefer one good meal a day, or perhaps one ounce of meat in the morning and another good feed just before dark; but he is appreciative of small helpings from time to time during the day and even after dark. When through feeding, he carefully and vigorously cleans his bill on his perch. He never seems to eat more than is good for him, although if perchance he should swallow something that he does not relish, which he seldom does, he immediately disgorges it.

We wonder whether he can see after dark; for one night he escaped and appeared to have no difficulty in finding a perch in a pine, where with a flashlight I easily found and caught him. Then again one night I gave him a piece of a mouse and put him in his box, where it was absolutely dark; about an hour later the food was gone. Whether he located this by touch, sight, or smell, I had no way of determining.

The bird plays furiously with pieces of rolled up paper, tearing them into small bits; and sometimes he is interested in grabbing and biting pencils, cards, bits of wood, and other small objects. He is greatly interested in cotton batting and tears it into small shreds. He jumps up and down with great gusto, striking at things that attract him on the table, then stops and at times gazes intently at some insect that we can not see on the wall or ceiling, or he deliberately shuffles along on his legs across the oilcloth top of the table in a very comical fashion. At times he even flies to the floor and for several seconds shuffles in this fashion.

Our bird bites us rarely, and then rather gently, apparently in play, unless we are

Fig. 43. Sparrow Hawk ready to play.

rough with him. If he is hungry he often comes and picks our hands or arms until we feed him, but he bites and scratches viciously whenever we have to place new strings on his legs. He works continually on the knots and on the string itself. At times he has managed to untie one of the knots, but now we have covered them with adhesive tape which he pulls at without success.

The Sparrow Hawk enjoys a looking glass, billing his image and striking at his reflection with his claws or beak. He carefully peeks around the edge of the mirror trying to see his supposed companion. He tolerates the moving picture camera, but never acts naturally before it; he seems to have a great fear of the continuous buzzing noise, and stands it only for a moment or two before flying excitedly away. Strange as it may seem, he does not appear to mind the graflex with its large eye staring at him and its more noisy shutter. Thus my moving pictures of this interesting bird have been rather disappointing. Since he always performs better at night, nearly all my pictures have been taken by artificial light.

I believe that our pet likes our company, and while he does not appear to be afraid of strange people, he never acts the same when I have him away from home. Sometimes when we are using the table as a writing desk, the bird will come over to us and playfully grab the pen or pencil that we are using. After he could fly well we allowed him to sleep on the front, enclosed porch. This was all very fine, except that the bedroom window had to be kept closed, otherwise the little fellow insisted on coming in and visiting my elder daughter, who slept in that room, and worse yet he always appeared at the break of day. Often he comes and rather gently bites our fingers or arms, or plays with our hair if we put our heads down to him. But if he becomes excited or angry, he stands up very straight and the feathers on the back of his head and neck stand up menacingly. He is apt at these times to express his disapproval in noisy sparrow-hawk language.

There remains to relate perhaps the most remarkable incident that so far has

occurred in connection with our pet. One morning he escaped, carrying his leash with him. Some very thoughtless people easily caught him, cut off the strings and set him free before we arrived. We were all much upset, for we supposed that our bird was gone forever. But at the end of two days he was seen near the place where he had been released. My daughter rushed across the street toward him, and when she was about one hundred yards from the bird, he flew cackling toward her with such speed and suddenness that he startled her and she threw up her arms. The hawk flew back to his former perch on the cabin. Then my wife went out with some meat and at once the bird flew to her and started eating. He seemed very happy and satisfied to be back home. Certainly he was a very hungry bird, for apparently he had not eaten while away. Now this suggests to me that while the hunting and feeding instincts are probably present in all birds, our bird was not able actually to catch his own food, because at the age when he left the nest his parents had not yet taught him how to hunt.

Of all the family, the hawk seems to like my small son the best, being very gentle with him, uttering satisfied little notes when he comes near, and never attempting to bite or strike him. He enjoys playing with the rest of us, though he is rather rough at times, especially if we are not gentle with him. On such occasions he will strike, bite, and scream angrily, even though I really believe he likes it. He is not too gentle in his play with my wife, although he seems to like her and always goes to her more readily than to any of the rest of us. One day he escaped again, and this time flew into a large pine. All manner of coaxing by the rest of us failed to bring him down, until my wife went out and stood under the tree and called to him. At once he flew down from his perch, fully thirty feet up, and lit on her hand even though he was not hungry.

Our Sparrow Hawk has been and still is a most wonderful pet; he seems very contented, is active and healthy; and as long as he continues to thrive we shall keep him. Every day we seem to learn more about the traits and moods of this most interesting little falcon.

Claremont, California, April 1, 1937.

BEHAVIOR OF THE PINE SISKIN

WITH ONE ILLUSTRATION

By Thomas L. Rodgers

Records of Pine Siskins (*Spinus pinus*) for the University of California campus at Berkeley, and for Strawberry Canyon, adjoining the campus, throughout the fall and early winter involve only scattered individuals. The birds are seldom heard, and when seen they are always on the move. Late in winter or early spring, however, they begin to flock, and from then on they are commonly seen foraging, or engaged in courting maneuvers prior to nesting, which begins around the middle of March.

In January, 1936, as through the rest of the winter, I made frequent trips into Strawberry Canyon, and on February 1, I saw my first flock of siskins. This flock of about seventy-five birds appeared "out of thin air" and alighted in a compact group, filling just the top six or eight feet of a leafless alder. Immediately the birds started foraging down through the tree, apparently working on the cones. They did not utter a note as they foraged, but occasionally, as if they had been frightened, there would be a high pitched *psee* and the flock would leave the tree, fly out in a loop of about

seventy-five-foot diameter and back into a nearby alder. The birds foraged actively, and often hung under the bunches of cones in chickadee manner.

On February 15, I saw a flock of about twenty, but only for a few seconds before it disappeared over the top of a large eucalyptus grove. On February 22, a very rainy day, I again observed a flock foraging in the alders in Strawberry Canyon. They foraged, as before, without uttering a note until the *psee* or *psee psee* notes would announce one of their characteristic "circle flights" ending in a nearby tree or one farther up or down the canyon. It began to appear as if the regular procedure of the birds was to alight in the top of a tree, forage down to the lower limbs, never spreading over an area more than 12 or 15 feet across, and then by means of a circular flight move to the top of another tree and forage down *it*. Although this was the commonest method, they were also seen to forage in a nearly horizontal line through a group of trees without foraging through any of them completely; they foraged up through a tree, and then moved by a direct route, at times even "flowing" from one tree to the next after the manner of a flock of Bush-tits. The direct flights of the flocks were either to trees far away or to those ten or fifteen feet off. This seems to bear out the idea that the "circle flights" are survey flights.

I wondered how the siskins were getting seeds out of the apparently tough little cones; so I located some on which I was certain the birds had been feeding, and collected them. They are tough, and I did not believe that the siskins could obtain the seeds were it not for a peculiarity of the cones. The ends of the scales are thickened so that their tips are close together. As the cones dry, the seeds are shaken loose from the axis of the cone, but, instead of dropping to the ground, they are held, with their thin membranous edges projecting out from between the scales, until further drying opens the scales and the seeds can fall out. It is while they are being held that the siskins can get hold of them and pull them out. The birds themselves, alighting on the bunches of cones, must shake many seeds to the tip of the scales where they are then available. I did not see any siskins foraging on the ground under the alders. This was probably because there was a sufficient and constantly replenished supply of seeds available at the cones, or because the seeds had not begun to drop to the ground, or, the most likely suggestion, that even though the seeds had dropped, they were buried in debris. This would take the seeds out of the ecologic niche of the siskin and put them in the niche of the scratching, underbrush birds such as the Song Sparrow and the Spotted Towhee.

On March 1, my attention was drawn to a large eucalyptus tree by the notes of siskins that were uttered as the birds foraged. Occasionally I heard, for the first time this season, the raspy, harsh, drawn-out *skree*. I observed two birds nip insects out of the air, but most of the foraging consisted of picking seeds out of the pods of the eucalyptus. The flock moved in a zig-zag course down through the tree, then in a straight course back up through it. It left after an hour of foraging. This tree had dense foliage as contrasted with the alders where I had observed siskins foraging before. The birds were uttering notes constantly, which contrasted with their previous absolute silence, and they did not retain nearly as compact a formation while foraging.

It is well known that birds that forage in dense foliage in flocks utter notes constantly. These notes almost certainly serve to inform individuals of their position in relation to the rest of the flock; they are called "location notes." A species of bird that utters these notes, in my knowledge, always utters them when foraging in a flock, regardless of presence of foliage. Can it be that the Pine Siskin uses location notes only when necessary?

Grinnell and Storer (Animal Life in the Yosemite, 1924, p. 439) mention that a

flock of siskins may forage absolutely quietly or that they may utter notes constantly; but, nowhere have I found any mention of correlation between the utterance of notes and the particular situation with regard to foliage. It was noted that when the birds suddenly left a leafless tree (with only a warning *psee*) they almost always left two or three individuals behind. If this illustrates need for location notes it would be certain that they would be necessary when the flock is foraging in dense foliage.

After March 2, siskins were seen often, in pairs or groups of three to five; and several times I observed pairs or groups of three birds leave the dead tops of eucalyptus trees, uttering notes which closely resemble part of the song.

On March 8, I put in five hours watching siskins at a place where they were very active. Here they were foraging in Monterey cypress and eucalyptus trees. Though they were not foraging in flocks they did tend to concentrate in certain areas, and some tended to stay together while foraging through a tree. During the whole morning, I saw flying birds in flock formation (fifteen or twenty birds) only twice. Altogether I estimated that about one hundred and fifty siskins were foraging in the area. Possibly it was one large flock beginning to break up.

While in the cypress trees, where they foraged most of the time, the birds moved about on the tips of the branches, balancing on a tuft of foliage or hanging below it. They picked, pulled lightly, and at times tugged at the vegetative tips as if trying to break them off. Juncos were foraging on the same tips, but never hung below the twigs. Audubon Warblers foraged in nearly the same niche, but usually stood on the twigs and reached to the foliage for their food. Six or seven times during the last three hours of observation, I saw juncos fly at a branch tip on which one to three siskins were feeding, and in two cases the juncos actually took possession of the branch tip. Once, I saw a junco fly at an Audubon Warbler in a similar manner.

Here, among the outer twigs of the Monterey cypress, there were ground-foraging, and tree-foraging fringillids and warblers all after the same food supply. It was an interesting overlap of habitats. The Audubon Warblers foraged in true warbler style, by hopping from twig to twig and reaching out to the insects on the foliage. The juncos, normally ground feeders, were inclined to alight on the compact bunches of foliage and pick insects from the leafage at their feet. The siskins, being agile tree foragers, often hung below the foliage in chickadee style, and in this position they did not conflict with either of the other birds. However, siskins also are common ground feeders, and were inclined to forage as the juncos did. Thus, at times, they conflicted with the juncos. The juncos occasionally found the compact foliage insecure to perch on, as demonstrated by their occasional quite apparent clumsiness there. Accordingly, they resorted to the larger twigs, in spite of their poor location in relation to the food, and thus conflicted with the Audubon Warblers. The number of actual conflicts between the various birds was directly proportional to the degree of convergence of their forage beats or of their usual methods of feeding. Conflicts were observed between juncos and siskins six or seven times, between juncos and warblers once, and between siskins and warblers not at all.

I was unable at first to determine, by observation, exactly what the birds were eating, so I collected one hundred cypress tips, averaging three inches long and representative of places all over the side of a tree on which I had watched many siskins foraging. Examination of the cypress tips showed many psocid-like insects, many scale insects, a few small green caterpillars, and many yellow larvae that were inside thin-walled cavities in enlarged green vegetative tips. There were few indications of broken-off vegetative tips, but some were damaged, which probably indicated that some of the yellow larvae had been torn from their chambers. The indication was

quite definite that the siskins were taking only insect food. I tasted the green tips and the yellow larvae; the green tips were bitter and the yellow larvae were rather sweet. Grinnell and Storer (*op. cit.*, p. 439) report that siskins eat tips of conifers. I wonder if they chose the insects in preference to the young tips of cypress because the cypress tips were bitter and the insects sweet.

On March 8, I noticed that many of the siskins that were foraging in eucalyptus trees were not foraging on seeds, but on the blossoms. Several times, I saw siskins approach blossoms from above, lean over and reach into them. I had supposed that they were after insects attracted by the flowers, but twice I noticed that after reaching into the blossoms, they raised their heads after the manner of a chicken drinking. I gathered a large bunch of the blossoms and in every one examined found several drops of clear sweet liquid, with only a slight eucalyptus flavor. Later, I saw more siskins drinking from flowers, also a junco. Since then, many flowers of eucalyptus have been examined, and most of them contained a good supply of the sweet liquid. Since early in February, I had noticed that the siskins were feeding on eucalyptus seeds. Robertson (Condor, vol. 33, 1931, p. 139) and Gander (Condor, vol. 31, 1929, p. 251) also have reported siskins feeding on these seeds. One author says that the seeds of eucalyptus make up the larger part of the diet of siskins throughout the year. The drinking from flowers, however, puts a new light on the story.

The need of a water supply for birds on a strictly seed diet is well known. During this period of observation of the Pine Siskin, I often wondered where they were getting liquid, because it was not until March 31 (with one exception) that I saw a siskin on the ground, and for much of the time before insects were plentiful the diet must have consisted largely, if not entirely, of seeds. Since the old pods of the eucalyptus hang on the trees at least through the blooming season, it seems quite likely that the siskins could eat a steady diet of eucalyptus seeds and never have to come to the ground for water.

Twice on the morning of March 8, I witnessed the first definite courting maneuvers. A siskin was seen circling in a slow, fluttering flight around the top of a cypress tree, repeating in fast succession, notes that resemble the incomplete song. Three other siskins were perched in the top of the tree. The circle followed had a diameter of about ten feet, just included the top of the tree, and sloped up away from the tree about twenty-five degrees from the horizontal. The top was circled at least four times; then the singing bird alighted just below the other three; but as they were approached, they all flew, leaving the pursuer there alone.

On March 15, on the University of California campus, I heard a siskin in full song. On March 18, a flock of eighty or more siskins was seen in Strawberry Canyon. A week later several smaller flocks were reported there foraging in the live oaks. The next week I saw many siskins in pairs; they were not foraging, but were singing. Two siskins singing, and uttering all their notes, can sound like a whole flock. They sing mightily, and hop around through a tree, one following the other; then they fly off, one after the other.

By April 9, siskins in pairs, or alone on the lawn eating dandelion seeds, were a common sight on the campus. This was the first ground foraging I had seen in this season.

A summary of the activities of the Pine Siskin from January until early April is as follows: Birds that have been widely scattered and wandering all winter, form flocks of 70 to 120. These flocks forage together wherever there is an abundant source of food. They tend to break up into smaller and smaller flocks, until they are commonly seen in groups of three to five; and finally, about March 20, pairs are dominant.

However, many birds are still foraging in flocks. While the birds are in flocks, they spend nearly the whole day foraging, but as they begin to pair off, they seem to put most of their energy into singing and courting maneuvers; in fact, except for the birds that are still in flocks, a foraging bird, at any time of day, is a rare sight at this stage. By this time the nesting cycle is under way, and nest building has begun.

Although Pine Siskins usually nest in places that are inaccessible for detailed study of their habits, in the spring of 1934, on the campus of San Jose State College, I located a nest that was near the top of a small redwood tree about forty feet from the ground and which was so situated that I could look down into it from the trunk, about eight feet away. In the period of my observations the siskins experienced adverse weather conditions. Had it not been for my presence, they would probably not have succeeded in raising even part of their brood.

The nest, then containing two eggs, was found on May 16. It was placed about two-thirds of the way out on an eleven-foot limb. There it straddled the single main stem where it was about three-fourths of an inch in diameter, and where there were some leaves, but no side branches, large enough for support. The body of the nest was built of weed stems and redwood petioles, and it was thickly lined with soft grass.

During the first two or three days of incubation the wind blew so hard that it tilted the nest, and I fully expected the eggs to roll out. The wind then quieted down, but the nest remained tilted at an angle of about fifteen degrees. The weather was better until May 29, the day the young hatched.

On the afternoon of May 29, a stiff wind began to blow, and by the next day it developed into a gale. The limb on which the nest was built was blown to as much as 50 or 60 degrees from its normal position, and the nest was tilted so badly that the brooding bird struggled constantly to keep from being blown from the nest. On this day, while I was watching the birds, one of the young fell out of the nest, but I was able to catch and return it. The nest was badly damaged by this day's wind, but still the storm continued. The next day one bird was missing; I saved another bird that toppled over the edge of the nest. In spite of the fact that the nest was becoming increasingly damaged by the wind, the parent birds made no effort to strengthen or repair it. On June 1, another bird was missing.

On June 2, I made a ring of grass and fastened wires to it so that I could place it down over the nest and attach it securely by twisting the wires together under the limb. In this way I intended to build up the sides of the nest, and at the same time to hold it more securely to the limb and to make it level. As I put the ring down over the nest the adult bird left, but it returned immediately and stayed within 14 inches of my hand as I adjusted the ring. As I fastened the wires, the bird went back on the nest, and it defiantly pecked at my finger as I put it against her side.

In spite of the storm, the damaged nest, and my constant interference, feedings took place regularly. During the brooding period it required the constant attention of one bird to keep the young from being dumped out by the wind.

After the brooding bird sat for several minutes to an hour, during which time it uttered no sound but occasionally wiggled a bit as if adjusting the young, the silence suddenly was broken by a *ti-er, ti-er,* coming from another tree about one hundred feet away. The brooding bird perked up and answered "*ti-er.*" The birds would call back and forth from three or four to a dozen times according to how cautiously the approach was made. The bird carrying food flew to a position only a few feet from the nest and there uttered from one to three or four of the more plaintive *pseee* notes. Then the approaching bird hopped quietly from twig to twig toward the brooding bird. During this part of the approach, both birds were absolutely silent as if trying

not to attract attention to the exact location of the nest. The young birds could be heard uttering a fine, high-pitched, almost insect-like note from the time of the first calls of the approaching bird until they were finally fed.

As soon as the bird bringing food was within a foot of the nest, the brooding bird lifted its wings a little, bent its head back, with its bill up and toward the approaching bird, and quivered. This quivering continued until after food had been received. The bird bringing food approached to the edge of the nest, stopped, drew its neck up short as if gulping or swallowing, clapped its bill gently together several times and food was brought into the mouth. The food could usually be seen along the edges of the bill. It was a thick paste and was yellowish or, as I saw it twice, light green. The light green paste may have been aphids, since I later saw a siskin picking aphids from the leaves of a tree and feeding a young bird just out of the nest. The feeding process continued by the clasping of the bills of the two birds, the upper and lower mandibles of one just closing the complete gape of the other. Three or four such contacts were made, and, between each, the bird doing the feeding gulped as if bringing more food into its mouth. The bird then flew away, and the brooding bird sat quietly for eight or ten seconds before proceeding to feed the young. The brooding bird fed the young at five of the six feedings that I witnessed.

When the young were to be fed, the adult moved back to one side of the nest,

Fig. 44. Parent Pine Siskin at nest, regurgitating food to be distributed among young (upper), and watching for droppings (lower).

raised up as if sitting on the edge of the nest, drew its neck back and regurgitated food (fig. 44, upper), passing from one open mouth to another. Some of the twice-partly-digested food was put into each of the mouths, around and around and back and forth, about four to six times to each. Food was strung from one to the other in a very sloppy manner. After each feeding, the parent cleaned up the nest.

During the first eight days of brooding, the nest was kept absolutely clean, and, as far as I could determine, all the droppings were eaten. Every time, after the young were fed, the brooding bird would search around in the nest and pick up the droppings and eat them (fig. 44, lower). Twice, once on May 30, and once on June 1, a young bird was observed to elevate its posterior end toward the parent's bill and exude a dropping. The parent bird received it directly and ate it. On the ninth day droppings estimated to be those of about twelve hours accumulation were on the edges of the nest. They were judged to be droppings of the parent bird. During the next thirty-six hours, until the two young left the nest, no droppings were seen taken from the nest, and, judging from the accumulation on the edges, none was removed.

Berkeley, California, March 30, 1937.

THE WHITE-CHEEKED GOOSE IN CALIFORNIA

WITH THREE ILLUSTRATIONS

By James Moffitt

The A. O. U. Check-list (1931, p. 37) gives the range of the White-cheeked Goose (*Branta canadensis occidentalis*) as "The Queen Charlotte Islands, British Columbia, and along the coast of southeastern Alaska to the vicinity of Prince William Sound." This statement implies that the bird is non-migratory, a contention justly questioned by Alfred M. Bailey (Auk, vol. 44, 1927, p. 190) and definitely disproved at the time this goose was named by Baird (Pac. Railroad Reports, vol. 9, part 2, 1858, p. 766); for the type was collected at Port Townsend, Washington, which is south of the bird's breeding range. Jewett (Condor, vol. 34, 1932, p. 136) recorded winter-taken specimens of *occidentalis* from Netarts Bay, Salem, and Eugene, Oregon, and wrote of others shot at the mouth of the Rogue River, Oregon; this last locality is the southernmost recorded occurrence of the subspecies. The present paper will, for the first time, definitely extend this goose's known range into California, where it has recently been found to be a regular winter visitant.

Branta canadensis occidentalis has, it is true, in former years many times been recorded as occurring in California, but always erroneously. Swarth (Univ. Calif. Publ. Zool., vol. 12, 1913, p. 9) sums up these ascriptions with the conclusion that none was founded upon substantial evidence. He decided that only one race of large-sized *Branta canadensis* inhabited California, namely *B. c. canadensis*, the Common Canada Goose or Honker. Grinnell (Pac. Coast Avif. No. 11, 1915, p. 39) accepted Swarth's contentions, as have subsequent authors.

Swarth, in the same paper (*op. cit.*, p. 10), stated that if the White-cheeked Goose "occurs in this state at all it should be found along the extreme northern coast." This challenge to field observers seems to have remained unanswered for many years. With my interest in geese, which commenced in 1928, there grew a desire to investigate the matter. This, however, was not realized until early in 1932.

At that time I was working for the California State Division of Fish and Game, and I asked Captain of Patrol William Lippincott, then stationed at Eureka, if he knew of any large Canada geese wintering along the northwest coast. His reply that two sizeable flocks of "honkers," as he called them, fed along the coast and spent much of their time on the adjacent ocean sounded so much more like the habits of *occidentalis* than of *canadensis*, which is largely a fresh water bird in the West, that I determined to investigate the matter.

This was done the morning of January 18, 1932, when Captain Lippincott took me to Centerville Slough, south of the mouth of Eel River, 4 miles west of Ferndale, Humboldt County. Here he quickly showed me a flock of about 200 geese which were so wild that we could not approach close enough to permit of their subspecific identification, but it was evident that they were large members of the *Branta canadensis* group.

Later that morning we found a detached flock of eight geese, feeding in a grass field with eighteen Whistling Swans (*Cygnus columbianus*). I was able to crawl within 150 yards of the birds and with glasses satisfied myself that the geese were true white-cheeks, with dark, chocolate colored underparts. Other work prevented further goose investigations that day.

The next morning I returned to Centerville Slough at daylight to attempt to collect a specimen of the geese, to establish definitely their identity, but I found the birds so wild that none was secured. The same luck attended a second attempt the following day; but on January 21, I was fortunate enough to collect a young female, unmistakably referable to *occidentalis*. This specimen is one of the darkest individuals, ventrally, of many specimens of *occidentalis* which I have examined.

My next opportunity to visit the White-cheeked Geese of our northwest coast came early in 1933. Visiting the Eel River flock the morning of March 4, I found more geese than in 1933 and estimated that 225 birds were present. These were mostly of large size, but a few very small *Branta canadensis* were observed among them. That morning I took a young male specimen and the following day two more immature males and an adult female. All were clearly *Branta canadensis occidentalis*.

On March 5, 1933, I visited Lake Earl, 3 miles north of Crescent City, which is the other locality whence Lippincott reported the birds. There I met Mr. Ed McLaughlin, who was born and has lived most of his life at Lake Earl, and I learned from him that the geese are regular visitants there each winter, arriving about November 1 and departing in early April. No geese were seen in the short time spent here, but I was satisfied by Mr. McLaughlin's description that they were white-cheeks. He said that about 150 individuals comprised the wintering flock.

That fall I again visited Lake Earl, on October 27, where a group of 7 White-cheeked Geese, probably one family, was observed at close range. These were evidently the season's first arrivals, in advance of the main aggregation, for Mr. McLaughlin had noted no geese prior to this time.

The following day, October 28, 1933, I visited Centerville Slough, south of the mouth of the Eel River, Humboldt County, where a flock of 6 White-cheeked Geese was noted. These birds seemed to be established in the marsh and no doubt represented the advance guard of the wintering flock.

A desire to re-visit the White-cheeked Goose's California wintering grounds with time at my disposal to learn more about their habits was not realized until the spring of this year. My wife and I left San Francisco for Fortuna, Humboldt County, on February 28, 1937. At 5:30 p.m. we arrived at Centerville, which is on the beach 4½ miles west, by road, from Ferndale and is now only a farmhouse, though it was

once the main stage depot, halfway between Eureka and Capetown (hence the name Centerville). Here we were disappointed not to be able to see a goose on the marsh to the north. The next afternoon when we returned and looked out on the marsh, we found approximately 300 geese feeding in a grassy place about a mile and a half north of the road.

The following two days were largely devoted to studying the habits of these birds. The geese are apparently restricted in range, as far as the country about the mouth of the Eel River is concerned, to the small strip of marsh land bordering the Pacific Ocean from Centerville north for 4½ miles to the Eel River, and east not more than a mile from the ocean. Although we watched the birds closely these two days and during parts of three days later on, we never saw them alight outside this area, and local residents agree that they are so restricted in habitat. Twice we noted that a group of seven birds, another time twenty individuals, flew north of the Eel River, out of sight in this direction; but each time they returned to the marsh after 20 to 30 minutes absence.

The Centerville Marsh, which the geese inhabit (see fig 45), consists of natural grassland devoted to cattle grazing. It is separated from the Pacific Ocean by a sand

Fig. 45. Centerville Marsh looking northwest from road to its south. Note low vegetation, sand ridge, on which cabins to the left are built, and Pacific Ocean behind them. Goose roosting pond is to the right of the cattle barn in the center of the figure. Photo by author, March 5, 1933.

ridge 100 to 300 yards wide, so low that during heavy storms with high tide the ocean occasionally sweeps over it in places. The marsh is watered by Rush Creek, which flows in from the southeast to empty into Centerville Slough in the middle of the marsh, this running as a canal 100 to 200 feet wide through the long, north and south, axis of the marsh. A dam and flood gate have been built across the slough where it empties into Salt Slough, a backwater of the lower Eel River; hence the water in most of the marsh is quite fresh, being, at the time of our visit, only slightly brackish to the taste. Occasionally, when the ocean breaks over the sand ridge, the marsh must become saltier; but such contamination is quickly leached out of the soil by the heavy winter rains.

Vegetation, other than grass and clover, is sparse on the marsh, but there is an

abundant supply of these feeds. A few Sitka spruces (*Picea sitchensis*), salmon-berry (*Rubus spectabilis*) vines, and skunk cabbage (*Lysichiton kamtschatcense*), the latter in bloom at the time of our visit, border the road to the south of the marsh and attest to the boreal climate. Beach grass (*Ammophila arenaria*) has been planted on the sand ridge to prevent drifting. Here it affords the only cover, unless the tangle of stranded drift wood, logs and stumps, can be so termed. Some "three-square" (*Scirpus americanus*) grows along the margins of Centerville Slough and probably provides food for the geese, as does the pondweed (*Potamogeton*) which grows in the slough. Other than scattered clumps of rushes (*Juncus*) in swampy situations and some thistles on the higher ground, the marsh itself is clothed with short grasses.

This little grassy marsh, within hearing of the booming surf of the Pacific Ocean, is the preferred winter habitat of about 250 White-cheeked Geese. Here the birds prefer to stay, unless molested. Observational evidence indicated that at the time of our visit the geese were subsisting mainly on grass. The stomach of the specimen collected January 21, 1932, held only vegetable matter, leaves and stalks of pondweed (*Potamogeton*) of the leafy group (near *foliosus*). That of another, taken March 9, 1937, contained only finely ground roots and rootstocks of a wild grass. This stomach was but one-fourth full as the bird was shot at 6:25 a.m., before the morning feeding.

At night the birds invariably roost in the water, usually in a shallow pond of 3 to 4 acres extent in the center of the marsh, at the junction of Rush Creek and Centerville Slough. Here, like all upland North American geese, they rest and sleep standing in shallow water 3 to 4 inches deep, at the edge of the pond. It is interesting to note that in this respect *occidentalis* has not departed in behavior from its relatives of the Canada goose group; in spite of its considerably maritime predilections, it prefers to spend the night on *terra firma*, rather than on the water as do true brant. Several mornings when I had slipped out into the marsh under the cover of darkness, the white-cheeks were found roosting at the edge of this pond in the earliest light of dawn. Once, for no apparent reason, they left it for the meadow an hour before daylight; and another night, after molestation at their favorite roost, they spent near by on a smaller pond.

If not molested, the geese, of their own accord, usually leave the roosting pond shortly after daylight, as soon as flying visibility is good, and go directly to their favorite feeding ground. In the Centerville marsh this is of necessity close at hand. Normally, if not frightened, the birds leave in several groups. After some preliminary calling and discussion, a group, usually a small one, will rise and, without a sound, fly low to alight on the feeding ground. After a few minutes they are followed by a larger flock, and by others, until all the birds are assembled in the feeding area. The habit of sending out a small "advance guard" on these flights to the feeding grounds I have noticed to be quite general among all North American geese, and it is oftentimes a useful one when a hunter is waylaying the birds. If the geese are disturbed at the night roost before normal departure, they all fly off at once in a disorganized, loudly calling flock and will then circle several times high above the feeding area before alighting. Experience has taught me that geese, especially of the Canada group, are not the noisy birds they are said to be. Normally, if undisturbed, they are quiet indeed. Several mornings I waited an hour before daylight near the white-cheeks' roosting pond on Centerville Slough and heard no note until the birds commenced calling preparatory to leaving to feed. Most undisturbed flights were made in silence, with perhaps a honk or two on the part of one bird every minute or so. Then, too, when feeding, the birds remained for the most part absolutely quiet. Members of the Canada goose group do not seem to have the low gabbling feeding call of Snow and

White-fronted geese, that produces a rumbling sound when coming from a large number of feeding birds.

The white-cheeks were feeding in an area in the center of the marsh at the time of our visit. Droppings observed in this place indicated that it had been used for several days prior to our arrival. The birds fed in this locality until March 8, when nearby shooting disturbed them, after which they would not even fly over it and moved their feeding ground about a mile north. Older droppings observed at several places in the marsh at the time of our arrival indicated the locations of previous feeding areas. One of these was at the extreme western edge of the marsh, bordering the sand ridge. It was evident from our observations that like other upland geese, the white-cheeks will use a feeding area for several days, until it is fed out or the birds are disturbed on it, before moving to another location.

After reaching the feeding grounds the white-cheeks graze avidly for a couple of hours. If undisturbed, preening and loafing is then in order with a mid-day visit to water and more loafing there until midafternoon. About two hours before dusk the birds return to their feeding area where they graze until nearly dark. In the last daylight the birds return silently to the roosting pond in small gatherings, much as they left in the morning. This, then, is the normal routine of our wintering White-cheeked Geese, and it agrees quite well with my experiences with other kinds of upland geese in California.

Few days, however, seem to be normal ones for the Eel River white-cheeks. Persons walking along the sand ridge or cattle riders in the meadows often disturb the birds, as did our own activities on numerous occasions. The geese are extremely wary and fly from distant approach. Usually they will alight elsewhere in the marsh after the first flushing, but if they are disturbed twice, they will immediately head for the ocean, passing over the sand ridge and out to sea. Here they fly low over the waves, and in the case of my earlier visits in 1932 and 1933 were seen to alight on the water a mile or more from land, rest there two or three hours and then return to the marsh.

At the time of our last visit, however, the birds did not alight on the ocean off the marsh, but once over the sea, they pursued a southerly course, down the coast, out of sight. This was the case every day we disturbed them, except on March 8, when a strong south wind was blowing which they apparently did not care to fly into. Accordingly, after going out to sea and south a mile, they turned, headed north and flew back to the marsh just south of the Eel River, where they alighted. When going to sea, the birds did not leave the marsh in one band, but departed in several groups, perhaps a mile or two apart; but each flock followed the direction of the first. These flights presented the best opportunities to count the geese; and, while censuses were attempted on all occasions, the birds flew in such compact groups, ever changing rank and seldom keeping to the characteristic "V" shaped wedge formation for more than a few moments, that in all our tries we were unable to secure a single exact count. The shorter flights about the marsh were made in similarly ragged flight formations.

It was not until March 6, when we met Mr. Frank Moranda, who lives at Centerville, that we learned where the geese were going down the coast. It seems that the day of our arrival, February 28, Mr. Moranda walked down the beach from Centerville to False Cape, four miles south. There, on the slope of the 600-foot bluff rising from the beach, directly back of False Cape Rock, he found the entire assemblage of White-cheeked Geese resting. They were occupying the crest and both sides of a bare, rocky ridge running up from the beach and were not more than 200 feet above it. Mr. Moranda approached the birds closely, putting them to flight, and then hid in some bushes while the geese several times circled over him, being loath to leave the

spot. This observation accounted for the absence of the birds from the Centerville Marsh, the afternoon of our arrival.

Upon receiving this information from Mr. Moranda at nine o'clock the morning of March 6, the geese having already left the marsh in the direction of False Cape, we proceeded there at once, eager to see them in such novel surroundings. A road runs to a ranch house within two miles of the cape, whence we went for further directions. The people here informed us that they had not seen the geese for some time, but that in winter they often noted them feeding on the ridge back of the cape.

I walked out to the top of the bluff which forms the cape. For a mile back of the bluff the ridge is quite level and covered with grass. Oil Creek to the north and a gulch to the south provide steep slopes on either side of the ridge. There are slides, grassy flats, and some brush on these slopes. At the cape proper, and for nearly a mile along the ocean frontage between the canyons, there are steep slopes and slides with ridges and benches, between the crumbling crest of the bluff and the narrow beach. It was on one of these ridges that Mr. Moranda had seen the birds, and a local sheep herder told me that he had recently encountered them on a slide near the top of the bluff. These slides are in some places bare or rocky, elsewhere brush covered, and in a few spots Sitka spruce and thick stands of alder cling to their precipitous slopes. Grass-covered benches, seemingly ideal goose feeding places, exist on many of the slides, which are separated from one another by erosion gullies and alternating ridges. According to local residents, the geese apparently never alight on False Cape Rock, probably because it is bare of vegetation; they always resort to the mainland.

I inspected these slides and the slopes of the bluff for geese, but could find none. There is much similar country to the north and south of False Cape, and Cape Mendocino proper, four and a half miles south, presents almost identical conditions, so it might have proved a long search to find the birds without recent clues to their whereabouts. The local rancher advised us that they apparently feed on other ridges too, for they use the False Cape bluff for some weeks at a time, then again may not be seen there for two months. When feeding on the bluff, he said they sometimes do so on the slides and benches at the cape or along the ones on the canyons to the north and south of the ridge. At other times they feed on the flat top of the ridge, ranging back from the bluff for a mile, and even occasionally visit a small pond on the top of the ridge. This ridge back of False Cape is part of what is known as Bear River Ridge, which runs inland north of Bear River for a distance of 12 miles or more and attains an elevation of 2475 feet.

We were at Centerville at 6:00 p.m. that same evening (March 6) when the geese returned to the marsh. First came a flock of about fifty, which alighted at once on the feeding area. It was followed, about half a mile behind, by a smaller group which circled the marsh several times before joining the first arrivals. After them, came flock after flock in close succession, about a quarter of a mile apart, which flew directly to alight with the birds on the ground. These flocks averaged fifty birds each and came to the marsh from the south, over the hills just back from the ocean. They did not fly high, and one flock passed about 150 yards directly over our heads as we watched from the road.

We secured a great deal of information about these birds' habits from Mr. Frank G. Williams of Ferndale, who controls the property they inhabit on Centerville Slough. It is to him that I am indebted for permission to collect specimens of the geese on several occasions, as well as for many other favors. Mr. Williams has hunted the birds in winter and observed them for fifty years. He knew before I collected specimens that they were white-cheeks as distinguished from Common Canada Geese, which

latter kind he said he has never noted in the region. Most of Mr. Williams' information was corroborated by our observations related above, but some additional points are worthy of including here as follows: The first arrivals appear about October 25, after which the numbers increase gradually until the maximum is attained about November 15. This number has remained nearly constant at about 225 to 250 birds, over fifty years' time, excepting that more birds were present last winter than usual. The number is maintained from mid-November until spring departure, about April 14, when all leave at the same time. The geese spend most of their time on the Centerville Marsh and the adjacent ocean, but they go to the Bear River hills in the daytime when disturbed on the marsh, returning to it every evening. At times, when visiting Bear River Ridge, the geese occasionally alight on Kingman Pond, on the summit of the Ridge, ten miles inland. In Mr. Williams' wide experience with the birds, he has never known them to go farther from the marsh than to parts of Bear River Ridge, twelve miles distant. He has killed a number of White-cheeked Geese in his hunting experience and has examined many more taken by other hunters and has never weighed a bird which exceeded 9 pounds. The heaviest specimen I collected, a fat male, weighed 8 pounds 11 ounces.

We spent March 4 and 5, 1937, at Lake Earl, Del Norte County, where the situations inhabited by the geese are similar to those at Centerville Slough. The surrounding country, however, is much more attractive scenically. Lake Earl is a body of fresh water nearly five miles long and averaging over a mile in width. It parallels the sand beach of the Pacific Ocean north of Point St. George, a mile and a quarter inland. A channel several hundred feet wide and a quarter mile long connects the lake with the much smaller Lake Talawa (two by one-half miles in extent) which is separated from the ocean by a sand ridge. As at Centerville, the ocean occasionally breaks over this ridge during storms and inundates Lake Talawa; but for the most part its waters are quite fresh.

Much of the land surrounding Lake Earl is clothed with thick growths of conifers, prominent among which are beach pine (*Pinus contorta*), Sitka spruce (*Picea sitchensis*) and grand fir (*Abies grandis*). There are, however, fine meadows along the lake shore, which run back between tongues of timber. Lake Talawa, on the other hand, is largely surrounded by open country. Some pines border it back of grass meadows to the south and east, while the sand ridge forms its western boundary. North of Lake Talawa for two miles, and reaching inland to Lake Earl, is an interesting area, the one which is most used by the geese. A marsh with grass, clover, sedge (*Carex obnupta*), silver-weed (*Potentilla anserina*), clumps of rushes (*Juncus*) and of "three-square" (*Scirpus americanus*) the outstanding plants, covers most of this country except for the many sand hills scattered throughout the area. Some of these hills are 50 feet high and run in ridges with the loveliest little valleys between them, each with its small pond, sometimes flanked by a few willows (*Salix delnortensis*). It was on one of these ponds that the white-cheeks were night-roosting at the time of our visit.

When we arrived at Lake Earl, the morning of March 4, we found the geese feeding on a large meadow just west of the lake. There were about 125 birds in all, 90 in one group and two detached gatherings of 25 and 10 birds respectively. We drove them to flight and they all milled around over Lake Earl for a short while, then split into three groups. One group of 38 birds headed southwest for Point St. George and was followed shortly by another of 32. The remaining geese started to follow against the strong south wind that was blowing, but after several attempts, turned to alight on a mud-bar at the north end of the lake.

Mr. McLaughlin said that the flocks which disappeared in the direction of Point

St. George were heading for Castle Rock where they usually go when disturbed on the marsh. This rock or islet lies over a half mile offshore, south of the southern part of Point St. George. As viewed from land, north of Crescent City, its 208-foot peak is precipitous, except to the northeast where a small grassy valley affords some nearly level ground (see fig 46). Mr. McLaughlin told us that he has seen the geese sitting

Fig. 46. Castle Rock (in center background) from mainland just north of Crescent City, Del Norte County, California. Photo by author, March 4, 1937.

on the rock, by observing with a strong glass from shore. It is well known among local hunters that the birds seek a haven on the islet when disturbed, and Mr. McLaughlin said that they also visit rocks off the Oregon coast, north of Brookings. In fact, he told us that there is an evident interchange of birds between the Lake Earl flock and another one wintering to the north along the Oregon coast, for sometimes in winter most of the local group will be absent for a few days, when more birds are to be noted about Brookings. For the most part, however, the flock makes its headquarters at Lake Earl. Its number has run from 125 to 150 birds in recent years, which is more than visited the locality thirty or forty years ago. For a short time this winter, during the very cold weather in January, 1937, nearly 500 geese were present. The birds commence to arrive in late October and leave about the first of April, just as the Eel River ones do.

The morning of March 5, 1937, I set out a few goose decoys and hid in a blind before daylight in the field near Lake Earl where the geese had been feeding the previous morning. After a long wait in a drizzle, at 7:15 a.m., or nearly an hour after daybreak, 36 geese came low and silently from the direction of the roosting pond. They uttered only two honks and alighted without paying the slightest attention to my decoys, 200 yards to the west. There they quickly separated into two groups of equal size and commenced feeding avidly on growing grass.

I watched these birds from the blind for two hours, during which time they occasionally fed to within 125 yards of me and at no time were more than 200 yards distant. The two groups remained separate and about 50 yards apart. Only occasionally, at perhaps five-minute intervals, did a bird honk once or twice; otherwise they

were silent. In each group most of the birds fed with necks down all the while. The flocks were thus rather inconspicuous and at a distance resembled clods of earth more than birds. In each group, however, one bird was at all times alert and stood fully erect, on guard. In one flock this was usually a very large, cinnamon-breasted bird, judged to be an old gander. He was sometimes relieved for a few minutes while he fed, by a smaller bird thought to be a goose; but after grazing for a short interval he again assumed guard. Some of these geese were quite jealous of one another and often little skirmishes, with rushes at each other with half opened wings, resulted when two individuals approached each other closely in feeding. Often, perhaps to shake the accumulated rain drops off its wings, a bird would stretch to full height and beat its wings vigorously a few times, then settle back to feeding. Toward the latter part of my observations a number of the birds were apparently becoming replete, for many commenced to stand around and to preen.

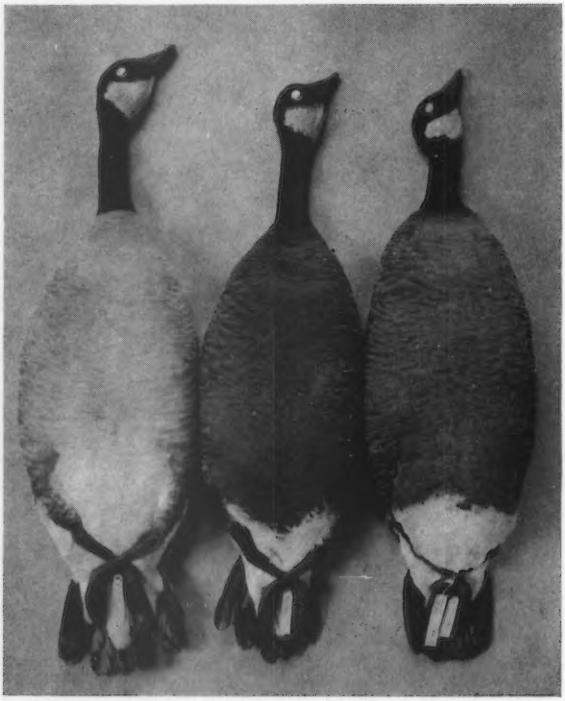
After two hours watching, during which time the birds paid little attention to my decoys, both groups worked closer to them than previously and I shot into one band, killing an adult female goose. This specimen (no. 42529, California Academy of Sciences) has the Drab (colors from Ridgway, 1912) ventral plumage, tipped with Tawny-Olive, of typical *occidentalis*. The bird was lean and weighed exactly 7 pounds. Its stomach was two-thirds full and contained vegetable matter exclusively (no gravel), much of which was finely ground; stems and leaves of grasses constituted 85 per cent of the bulk by volume and leaves of a chickory, 15 per cent.

Another adult female of *occidentalis* was collected on the Centerville Marsh, March 9, 1937. This skin (no. 42530, C. A. S.) has the ground color of the ventral plumage Hair Brown and the feather tips Ivory Yellow, which latter, in mass effect, give a much lighter cast to the specimen's under surface. This goose was quite fat and weighed 7 pounds 7 ounces.

Without attempting at this time to go into the interesting variations in both size and color which exist in this subspecies, I will say that the largest examples of *occidentalis* apparently breed in the southern part of the form's range, from Vancouver Island north to Glacier Bay, Alaska. Smaller ones are known to nest on the islands in the Prince William Sound region of Alaska. The winter birds collected in California seem to be intermediate in size between the two and probably nest in the region from Glacier Bay to Prince William Sound, perhaps in the vicinity of Yakutat Bay, whence no breeding specimens are known to have been collected. The California winter specimens of *occidentalis* (eight in number), while uniform in size, represent but one of three sizes of geese noted among the wintering flocks of Humboldt and Del Norte counties. Most of the birds seen in the field were of the size represented by the specimens. Their voices were higher pitched than those of Common Canada Geese, being about intermediate in tone between this form's note and that of the Lesser Canada Goose (*Branta canadensis leucopareia*). There were present, however, on each visit to the flocks in winter, a smaller number of obviously larger geese with lower pitched voices. It was observed that these larger birds tended to flock separately, usually in groups of from 6 or 7 to 30 or 40 individuals. This was especially evident when the entire flock was disturbed. At such times the parties of larger birds separated out. The flocks noted previously as flying north of Eel River, and the two groups that went toward Castle Rock on March 4, 1937, were the large ones, while the greater number of geese which kept together were of the kind collected. The big birds formed about 20 per cent of the flocks' total numbers. It is unfortunate that no example of the big birds could be collected, but they probably represent individuals from the southern part of the subspecies' breeding range.

It has been remarked that a few very small geese of the *Branta canadensis* group were noted in the wintering flocks. While no specimen of the little birds was obtained, wings of a desiccated goose picked up on the Centerville Marsh, March 8, 1937, measuring 343 mm. in length, indicate that at least some of these are referable to the Cackling Goose (*Branta canadensis minima*). Only one small bird was seen among both the Centerville and Lake Earl flocks in March, 1937. More little ones, with high pitched, yelping voices, were found at Centerville in 1932 and 1933, about ten individuals each time. Local hunters claimed that the small geese are more plentiful in mid-winter.

A young male in my collection (no. 1655), taken at Lake Talawa and presented to me by Mr. McLaughlin, exhibits the maximum of cinnamon coloration seen in this subspecies and it is strikingly like the type of *occidentalis*, now in the U. S. National Museum, the ventral color of which I recorded as matching Ridgway's Tawny-Olive. The young female (no. 1418, coll. J. Moffitt) taken on Centerville Slough, January 21, 1932, is even darker, more ashy, ventrally. Figure 47 shows a comparison of this



a b c

Fig. 47. Study skins of *Branta canadensis* from the author's collection. Reading from left to right: **a.** *canadensis* ♂ im., no. 1275, Yuba Co., Calif., Jan. 14, 1931; **b.** *occidentalis* ♀ im., no. 1418, Humboldt Co., Calif., Jan. 21, 1932; **c.** *occidentalis* ♀ ad., no. 1282, Prince of Wales Island, Alaska, April 2, 1920 (coll. by G. Willett).

bird's underparts with those of a specimen of *canadensis* and of a breeding example of *occidentalis* from Prince of Wales Island, southeastern Alaska. The photograph also indicates the superiority in size of *canadensis* over *occidentalis*.

As intimated previously, the present status of the two known California wintering flocks of White-cheeked Geese is to be regarded as satisfactory. Reports of residents indicate that during the past fifty years their numbers have increased slightly. Few of these geese are killed by hunters, and with shorter open seasons now in force this toll is anticipated to be even less than previously. The habit of resorting to the ocean or to ocean rocks for refuge, when they are disturbed, is a fortunate one for their welfare. There seems to be no danger that their favorite wintering grounds in California will be so changed by man as to adversely affect the geese.

In the foregoing account, I have attempted to emphasize how extremely local are the wintering white-cheeks in distribution. In further demonstration of this habit is the fact that members of the Centerville colony apparently do not visit Humboldt Bay, only five miles north of Eel River. At least none of a number of hunters interviewed knew the bird, nor was I able to find a specimen in several collections of birds in Eureka which I visited. Several examples of *leucopareia* and of *minima* from Humboldt Bay were found in local collections, but no specimens of large *Branta canadensis*.

With no desire to claim the following observation as a "record," for sight identifications of subspecies of *Branta canadensis* are always justly subject to question, I wish to mention some dark, large "Canada" geese noted at the mouth of Tomales Bay, Marin County, California, November 26, 1932. At eleven o'clock that morning about ten such birds, with moderately high pitched voices, flew high from the ocean to the north, over my blind, and continued directly southeast, down the bay. These were followed, about five minutes later, by four similar birds, one of which was much lower, not more than 120 yards over my head. In the clear light, the dark brownish ventral surface of this goose was plainly noted. Its size, manner of flight and voice were typical of *occidentalis*, which I truly believe it was. Then, too, I recall with regret a dark "Canada" goose of small size for *canadensis* which I shot in the middle of San Pablo Bay, about five miles southwest of Tubbs Island, Sonoma County, in the winter of 1919, and did not save as a skin. This recollection has always made me desirous of obtaining specimens from the gathering of large *Branta canadensis* wintering regularly on Tubbs Island and spending much of the daytime out on San Pablo Bay. The only specimen which I have seen from Tubbs Island, collected by and in possession of Mr. Nathan Moran of San Francisco, is, however, *B. c. canadensis*. Regardless of this, *occidentalis* is a bird which should be looked for in the San Francisco Bay region, where I feel confident it will eventually be collected.

SUMMARY.—The White-cheeked Goose is a regular winter visitant to the northwest coast of California where two flocks averaging 125 and 250 birds, respectively, winter regularly. The birds arrive in late October and remain until early April. They are extremely local in distribution, feeding and roosting in fresh water marshes near the seacoast, but they are maritime in habit to the extent that when disturbed they seek refuge on the ocean or upon offshore rocks. The status of the birds with regard to numbers seems to be perfectly satisfactory and they seem even to be increasing slightly.

California Academy of Sciences, San Francisco, California, April 30, 1937.

FEATHER STUDIES ON THE CALIFORNIA CONDOR

By Loye Miller

Since the California Condor (*Gymnogyps californianus*) has developed such a strong candidacy for the pluperfect status and seems likely to win in spite of all we can do to stem the tide, our interest has become most active, and any information regarding the species from any source whatever is considered worthy of record. I have recently had the questionable pleasure (with unquestionable profit) of tearing down an old and badly worn mount of the species, placed in my hands by Mr. W. Lee Chambers. Hunters had killed the bird in the Santa Monica Mountains, California, some thirty years ago and had brought it, none too promptly, to the Chambers' sporting goods store in Santa Monica where it was mounted in really creditable amateur fashion by Chambers and Harry Rising.

The bird was killed at a season when it was in the process of molting the remiges, so that a partial record of this process was obtainable. Unfortunately the long post-mortem deterioration of the plumage made it impossible to detect "unworn" feathers in those instances in which the calamus had been completely developed.

The youngest quill in the primary series was number five; a mere tuft of barbs was projecting from the enclosing sheath. Next older was number eight, with the calamus two-thirds complete. Then followed number seven with the calamus beginning to close at the base. Other primaries were complete and all probably had been fresh thirty years ago, except possibly number six which appeared more like an old quill than the others. Should this number six be the only remaining primary unmolted, we could say that at the time the bird was killed the molt was more than half completed for the primary series. Numbers one (innermost), two, three, four, nine, and ten, had been replaced and the remainder were following the order, seven, eight, five, and six.

There were twenty feathers in the secondary series, of which about one-third were developing feathers. The others appeared to have been recently replaced. The new feathers had sprouted in the following order: number one (outermost), fourteen, eighteen, three and nine, nineteen, and twelve. It would seem that the primary and the secondary series had both changed to about the same extent and that the molt had proceeded in both at the same time.

It was interesting to note that, in the spread wing, the vacancies in the primaries were temporarily closed up by the approximation of adjacent feathers, whereas the secondary spaces were not thus closed. This fact, due in part to the angle the feather subtends with the long axes of the wing bones and in part to the greater width of the secondaries, may be of importance. It would tend to keep the plane area more dependable in the region where greatest strain falls, that is, in the tip.

It is interesting also to note how the greater primary coverts are flexed at the junction of calamus with vane to support at least two of the primaries. To illustrate: the calamus of covert number one is bound very tightly to that of its primary on the dorso-distal side and the two are parallel out to the base of the vane. Here the shaft of the covert angles sharply outward, to cross primary number two and terminate in the space beyond it. This angle is less pronounced as the wing tip is approached and even becomes slightly reversed in covert number ten. Both the Andean and California Condors show this arrangement. Is it a provision for absorbing the great strain on the primaries and for distributing some of it to the coverts in these heavy bodied birds? The California Brown Pelican shows almost none of such arrangement, and in the Glacous-winged Gull, it is entirely lacking.

As the terminal portion of the wing was further dissected, the pollex or thumb proved most interesting because of the tremendous development of its claw. The majority of modern birds have but a single phalanx in the thumb and this bone is entirely covered by the skin in which the feather alveoli are developed. A few groups, widely separated as our present ideas of classification go, are, however, provided with a second joint to the pollex. This second joint is not covered with feather-bearing skin, but is terminated by a corneous claw which can be felt as a sharp thorn among the feathers. All the rails I have examined, even the great wood rails of Panama, have the claw, as do some hawks, some male domestic fowls, the South American palamadeids, and the cathartids. In *Gymnogyps* this claw is unusually long, measuring 30 mm. in the specimen dissected. Other condors examined show extreme development, though measurements were not possible without injury to the specimens. A young bird, with down on the head, had a claw of size proportionately greater than I have seen in other birds. The claw is strongly curved, but is not sharp pointed, and the taper is very gradual. There is no indication of its having been used against abrasive surfaces of a rocky substratum.

The claw appears to be made up almost wholly of corneous material, with but a small osseous element at its base. This ungual phalanx is articulated by a synovial joint to the basal phalanx, but the attachment is very weak and would not support the strain of any active use. I would look upon it rather as a rudimentary and functionless phalanx with an exaggerated sheath.

Dissection of the tail brought out the interesting fact that only six alveoli for the development of rectrices were to be found on the left side of the pygostyle, whereas there were seven on the right. Even then, a single rectrix of the left side was just bursting its sheath. With seven complete feathers on the right side and only five on the left, there must have been an appreciable muscular unbalance in the tail area during flight.

All the other twelve rectrices were complete, though it was not possible to determine whether they had been recently molted.

No date of capture was available for the specimen, hence the molting season is not directly indicated. Mr. Ernest I. Dyer very generously placed in my hands a freshly molted primary (number six) from a condor obtained on June 15. While working for photographic records of condors in Santa Barbara County he visited a certain "bathing pool," where the condors come habitually to bathe and preen in the sun, and here Mr. Dyer picked up the freshly molted feather. The date would suggest that condors begin the molt early; by comparison with the Santa Monica bird, they appear to be half way through the change of remiges by June 15.

This feather is really in excellent condition, not visibly the worse for wear. Molting of the flight feathers appears to take place before their efficiency is to an appreciable degree impaired. It was evidently produced by a relatively small individual, as it is nearly two inches shorter than a similar feather brought me thirty years ago by a student in a biology class.

This larger plume, primary number six, is really a magnificent structure, probably representing close to the maximum of feather development in strength and serviceability. The tail feathers of certain phasianids are longer in both shaft and barb, but they are fragile ornamentals without much power of resistance in the bird's monoplane. The condor plume measures 656 mm. (25.75 inches) across the cord of its pronounced arc. Under pressure it straightens out to 690 mm. During flight the primaries may straighten completely, or even yield into a reverse curvature.

Of this total length, the calamus from base to first downy barb (superior umbilicus) measures 144 mm., has a maximum transverse diameter of 10.3 mm., and a

maximum sagittal diameter of 11.5 mm. The early gold miners of the western placers are reported to have used condor quills as containers for their gold dust. Because of lightness and unbreakable texture, they might have served very well. A quill of the dimension just recorded was filled with fine uniform grained sand which was then poured into a ten cubic centimeter graduate which it filled just to the top. Such a container, then, would seem to have a very appreciable capacity for so concentrated a form of wealth as gold dust.

University of California at Los Angeles, April 16, 1937.

WEIGHTS OF SPOTTED TOWHEES

By JEAN M. LINSDALE and E. L. SUMNER, Sr.

The weights of birds are useful for several purposes, among them the interpretation of geographic variation in body size and as indicator of seasonal change in physiological behavior. It is necessary, however, in using them to make proper allowance for the several kinds of influence which affect weights under various circumstances. In order to learn something about these influences for certain fringillid species we kept records, in 1932-33, of weights of Golden-crowned Sparrows (*Zonotrichia coronata*), Fox Sparrows (*Passerella iliaca* subsps.) and Spotted Towhees (*Pipilo maculatus falcifer*) trapped on the campus of the University of California at Berkeley.

Reports on the first two species have been printed (Univ. Calif. Publ. Zool., vol. 40, 1934, pp. 309-320; Condor, vol. 36, 1934, pp. 107-112). Although fewer records are available for Spotted Towhees, we consider them worthy of summarizing because this species is permanently resident while the other two are migratory; we were able to distinguish sexes in the towhee, but not in the other two; and the inconvenience involved in trapping and weighing this bird makes it unlikely that anyone else will provide this information.

Table 1. Weights of a male Spotted Towhee (no. A 283839) in the spring of 1933.

Date	9 a.m.	1 p.m.	5:30 p.m.	Date	9 a.m.	1 p.m.	5:30 p.m.
Jan. 10	.....	41.00	.....	Mar. 14	.....	40.00	42.05
Jan. 14	.....	.....	41.95	Mar. 30	40.95	.....	.....
Feb. 15	.....	40.30	.....	Apr. 22	.....	.....	40.35
Feb. 18	.....	39.70	37.10	Apr. 26	38.80	.....	39.70
Feb. 26	41.20	.....	.....	Apr. 27	41.05	.....	.....
Feb. 28	.....	.....	41.60	Apr. 28	38.90	.....	.....
Mar. 4	40.10	.....	.....	May 3	40.65	.....	40.90
Mar. 6	.....	.....	41.55	May 10	38.65	.....	.....

Table 2. Weights of a male Spotted Towhee (no. A 283838) in the spring of 1933.

Date	9 a.m.	1 p.m.	5:30 p.m.	Date	9 a.m.	1 p.m.	5:30 p.m.
Jan. 10	39.70	.....	38.60	Feb. 22	36.95	.....	39.50
Jan. 14	38.70	.....	.....	Feb. 24	39.85	.....	.....
Jan. 17	.....	40.25	.....	Feb. 26	37.85	.....	.....
Feb. 3	.....	40.20	.....	Mar. 1	.....	.....	36.85
Feb. 6	.....	41.75	.....	Mar. 6	36.10	.....	.....
Feb. 7	38.75	.....	41.00	Mar. 14	.....	39.40	.....
Feb. 8	.....	.....	38.25	Mar. 20	.....	37.05	.....
Feb. 9	.....	37.90	.....	Mar. 21	36.50	37.35	.....
Feb. 10	34.70	37.65	42.05	Mar. 22	37.75	40.60	.....
Feb. 14	.....	38.85	.....	Mar. 23	38.10	38.35	39.85
Feb. 15	36.65	38.85	.....	Mar. 24	.....	39.40	38.05

Table 3. Extremes and ranges of weights (in grams) of male Spotted Towhees trapped ten or more times.

Band No.	No. Records	Minimum Date	Minimum Wt.	Maximum Date	Maximum Wt.	Range
A 283061	10	Jan. 13	34.85	Jan. 9	42.90	8.05
A 283838	33	Feb. 10	34.70	Feb. 10	42.05	7.35
A 283839	20	Feb. 22	37.10	Mar. 14	42.05	4.95
A 283849	10	Mar. 20	34.30	Feb. 28	38.55	4.25

Table 4. Summary of weights (in grams) of male Spotted Towhees trapped during the winter of 1932-33 at Berkeley.

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
Number weight records	1	4	8	5	18	44	24	9	3
Average weight in morning	....	40.10	42.05	40.00	38.53	38.48	38.22	39.58	39.65
Number birds	....	2	3	1	5	5	4	1	1
Average weight at noon	38.10	37.65	39.90	40.37	39.18	39.32	38.16	35.58	....
Number birds	1	1	3	3	5	8	3	1	....
Average weight in afternoon	....	39.90	45.80	36.45	39.57	39.11	38.18	38.39	40.90
Number birds	....	1	1	1	4	7	4	3	1
Average all weights	38.10	39.44	41.66	39.51	39.06	39.03	38.19	38.07	40.28
Minimum weight	38.10	37.55	36.15	36.45	32.95	34.70	34.30	35.20	38.65
Maximum weight	38.10	42.65	45.80	42.10	44.30	43.80	42.05	41.05	40.90

In general, the 116 records of weight of male Spotted Towhees summarized in tables 1 to 4 show the same sort of variability already described for Golden-crowned and Fox sparrows. The male towhees, though, do not show the peak reached by the other, migratory species just before their migration in the spring.

Museum of Vertebrate Zoology, Berkeley, California, August 5, 1936.

STUDIES OF WATERFOWL IN THE CARIBOO REGION, BRITISH COLUMBIA

WITH TWO ILLUSTRATIONS

By J. A. Munro

The Cariboo region, comprising portions of the watersheds of the Fraser and north Thompson rivers, is probably the most important nesting ground for waterfowl in British Columbia. It is well supplied with water areas of every description, including large lakes with heavily wooded and rocky shores, small, deep lakes surrounded by willows and dogwood and covered by yellow pond lily, *Typha* and *Scirpus* marshes, open alkaline ponds, barren "soda" lakes, marsh-edged sloughs, and beaver meadows. Many of the smaller lakes, hidden away in the aspen and jack-pine forests, and known only to the few settlers, are difficult of access; others may be reached by motor road.

In the summer of 1936 I explored many of these waters by means of a light canoe. Canoe transport made possible an intensive examination of areas which in previous years had been viewed from the shore only and provided opportunities for close observation of waterfowl behavior. The program included an inquiry as to a possible correlation between the presence of loons, Holboell Grebes and coots and the mortality among young ducks. A report of this investigation, together with other observations on the behavior and life history of certain species, is submitted in the following pages.

In 1936, waterfowl populations in certain particularly favorable localities were probably at a saturation point; in other, "marginal" areas the numbers of breeding

birds were much less than could have been maintained by the amount of food and cover available, a condition that has been observed elsewhere when waterfowl were much more abundant than they are now.

103 MILE LAKE.—This shallow lake, less than a mile long, contained a waterfowl population sufficiently unusual to justify detailed description. It is surrounded on three sides by open range dotted here and there with clumps of lodge-pole pine and trembling aspen; the land on the south side rises steeply and is well wooded. The shores and bottom are hard clay, gravel and boulders; the only cover vegetation is an open growth of *Scirpus* extending outward from the shore's edge on the east side of the lake and elsewhere established in small clumps twenty to fifty yards out from the beach. Around the circumference of the lake to a width of forty to sixty yards is a heavy growth of aquatic plants chiefly *Myriophyllum,* with a lesser amount of *Potamogeton pectinatus*. The surface of this weed bed was covered with filamentous algae; the deeper water farther out was turbid with blue-green algae. Amphipods were not abundant, as was found to be the case in some other lakes of the region, and no evidence of the presence of any group of mollusca was obtained; the food supply was predominantly vegetable.

On August 8, 1936, this small lake was inhabited by approximately 2000 ducks comprising (1) a population of non-breeding, post-breeding and young diving ducks with which were associated a few Baldpates (*Mareca americana*), American Coots (*Fulica americana*), Holboell Grebes (*Colymbus grisegena holboellii*), and Eared Grebes (*Colymbus nigricollis californicus*); (2) a concentration of surface-feeding ducks; and (3) a small population of female ducks accompanied by broods.

In population number one some of the ducks, principally Lesser Scaup Ducks (*Nyroca affinis*), were flightless; others were losing, or perhaps regaining, the power of flight. Buffle-heads (*Charitonetta albeola*) were principally females in worn, faded plumage (probably non-breeding yearlings) and flying young. In addition there were two males, thought to be yearlings, and at least two broods, of seven and eight, about three-quarters grown, each accompanied by an adult female. Half of the Barrow Golden-eyes (*Glaucionetta islandica*) were non-breeding yearling females; one was an adult male in eclipse plumage, the remainder adult females and young of various ages not all of which were in broods. Canvas-backs (*Nyroca valisineria*) and Ruddy Ducks (*Erismatura jamaicensis rubida*) were all adult males; the White-winged Scoters (*Melanitta deglandi*) comprised one adult male and three adult females. Baldpates were chiefly adult males in eclipse plumage, and the association of this species with the diving ducks was a parasitic one, identical with that commonly observed during autumn and winter when Baldpates attend the diving operations of coots and diving ducks.

These ducks, grebes and coots, without segregation of species, formed a close association, a "raft", which if dispersed came together again very quickly. As this raft was approached it spread out as many birds moved inshore and swam along close to the beach in a formation that rapidly lengthened. When the canoe drew nearer, those birds able to fly began to rise from the water, the different species usually rising together, and moved in short flights to another part of the lake where they reassembled. Meanwhile the flightless birds, for the most part unseen after an initial dive and momentary reappearance, travelled quickly in the same direction so that after an hour or so the association was much the same as it had been before. This breaking up and reassembling of the flock took place four times as the observers paddled from one end of the lake to the other. Exact counts of the various species under such condi-

tions proved impracticable so that it was necessary to rely on estimates which were checked and re-checked in the course of a period of four hours. The composition of population number one was as follows:

Baldpate	over 50	White-winged Scoter	4
Canvas-back	8	Ruddy Duck	17
Lesser Scaup Duck	150	Coot	23
Barrow Golden-eye	60	Holboell Grebe	5
Buffle-head	600	Eared Grebe	5

The population of surface-feeding ducks (2) comprised flocks of Common Mallards (*Anas platyrhynchos*), Green-winged Teal (*Nettion carolinense*), and Blue-winged Teal (*Querquedula discors*) which were made up of females and flying young. In addition there were a number of adult male Mallards, chiefly solitary, and a few Shovellers (*Spatula clypeata*). All these ducks frequented the lake shore, more particularly at the marshy east end, and although they were flushed numerous times they did not leave the vicinity. Both species of teal were found in one flock and it was common to find mallards and Blue-winged Teal together, one such flock comprising seventy-five teal and eighteen mallards. This population contained:

Common Mallard	100	Blue-winged Teal	230
Gadwall	1	Shoveller	10
Green-winged Teal	60		

It was impossible to identify the breeding population (3) so late in the season. Very likely some of the young Mallards, Blue-winged Teal, Barrow Golden-eyes and Buffle-heads included in population (1) and (2) had been raised on the lake. Two broods did not, during the times they were under observation, join the mixed assemblage forming population (1); these were Blue-winged Teal with brood of four, and White-winged Scoter with brood of nine.

Lesser Loon. *Gavia immer elasson.* In the course of the summer's investigations forty-eight adult loons, comprising twenty-two pairs and four solitary and apparently unmated individuals, were under review. According to careful observations this total of twenty-two pairs had produced nine young. It might be suggested that many small young, because of their wariness and the readiness with which they can conceal themselves, might have escaped attention. I do not believe this to be the case because in the first place the season was far advanced and the young well grown, and in the second place the young birds which did come under observation were detected without difficulty. Furthermore, several pairs of loons under daily observation for periods of ten days or longer, at no time were accompanied by young, although time and again they made elaborate demonstrations which usually would be interpreted as indicating vigilance in defense of young. It was, of course, too late in the season for loons to be incubating eggs. Possibly this behavior is a mechanical reaction, indicative of a particular physiological stage in the breeding process and produced automatically when the nesting territory is invaded by enemies.

Thus on August 15, at Horse Lake, when I approached an open bed of *Scirpus* growing on a shallow reef near the entrance to a marshy bay, a pair of loons showed great excitement. One of them standing upright with neck curved back, chest out-thrust and half-opened wings curved forward, called again and again with various modifications of the familiar laughing call. After this demonstration the bird made a series of short dives, swimming just below the surface for only a short distance, then emerging and diving again. The previous evening this same pair had been seen racing over the water, half-flying and half-swimming as they commonly do during the courtship period.

These two, under observation from July 23 to July 30 and from August 13 to August 23, spent much of their time in the vicinity of the open *Scirpus* bed referred to, which appeared to be their chief feeding ground. Squawfish and lake shiners were plentiful in this shallow portion of the lake and so also were snails, *Planorbis*, which are known to be a food eaten by loons. At various times they were joined by a second pair, also without young, whose territory centered around a half-mile stretch of *Scirpus* situated about a mile to the east; occasionally also a fifth, unmated bird joined them. Thus on August 19, while I was watching the local pair from a canoe distant from them about thirty to fifty feet, the single bird was seen approaching. It travelled slowly down the lake, peering below the surface with head submerged in much the same manner in which a merganser searches for fish. As it neared the two others, one of the pair gave a short, single note repeated at regular intervals—a note of recognition or of welcome.

In the case of a pair with two half-grown young, one young bird accompanied each parent. The parents were swimming about 200 yards apart when first they came into view. One of this pair showed more excitement than did the other, calling and diving repeatedly, close to my canoe. Meanwhile the two young birds commenced diving, and as they showed only their heads above water when emerging, it soon became difficult and finally impossible to locate them. The parents finally swam close together and allowed the canoe to approach within thirty yards or so before they dived.

It was noted several times in watching loons with young that one of the parents defended the territory while the other remained with the young. For example, in the case of a pair with one half-grown young on a small lake near Horse Lake, one of the parents with neck outstretched surged across the water toward my canoe and when 25 yards or so distant stood upright, churned the water with rapid wing-beats and gave the laughing cry a number of times. The second parent, some distance away and accompanied by the young bird, was less vocal and made no demonstration suggestive of anger or alarm.

Again, on another somewhat larger lake which was occupied by three pairs of loons, similar behavior was noted. One parent remained with the young bird while the other approached the canoe with noisy cries and demonstrations of anger. In one case the bird approached by a series of movements which threw the body forward so that it cleared the water by perhaps a foot; then dropping with a splash it repeated the movement. This forward thrust and subsequent splash into the water was made four or five times while the bird approached directly toward the canoe. In other cases one of the birds would swim toward the canoe for a certain distance, then would turn with a surging rush that preceded a dive.

One of the most noticeable characteristics of the loons in the Cariboo district was their unusual tameness, perhaps indicating a freedom from molestation that not everywhere is the case. It was a common occurrence on many lakes, while travelling by canoe, to approach within fifty feet or less before the birds would begin slowly to sink in the water.

Holboell Grebe. *Colymbus grisegena holboellii.* At Horse Lake a pair of these grebes had nested in a bulrush bed near the entrance to a marshy bay. The activities of these birds appeared to be closely confined within a definite area comprising the waters along about one-quarter mile of shore. On July 23 two young about three-quarters grown accompanied them; shortly afterwards one young disappeared, and the parents and the remaining young bird were observed in the same territory until the investigation was concluded on August 23.

On one occasion an adult rose to the surface with a small sculpin held crossways

in the bill. This was swallowed almost immediately. Another time an adult was seen holding a fish about four inches long by the head. Hoping to make the bird drop the fish so that it might be collected and identified, I paddled rapidly toward it. The grebe dived and reappeared with the fish still grasped by the head; held thus, the bulk of the fish kept the bird's mandibles some little distance apart, and with the bill partly open in this way the bird called several times, then suddenly threw back its head and swallowed the fish head first.

Several times the voice of a half-grown Holboell Grebe was heard as it swam along behind one of its parents. The sounds, described at the time as trills and soft whistles, were sustained and musical—a true "bird song". Their origin, not at first traced to the grebe, was sought among the trees and brush at the water's edge. Finally the performance was heard at such close range as to leave no doubt that the young bird was responsible.

Baldpate. *Mareca americana.* This was the commonest nesting duck on Bridge Creek below Horse Lake; elsewhere it was less common. On Bridge Creek it was observed that female Baldpates when approached usually left their broods and proceeded upstream ahead of the canoe, flying a short distance, then swimming, and calling almost continuously. After having travelled several hundred yards in this manner the duck usually circled back down stream, again passing about thirty or forty yards above, and a short distance to one side of, the canoe. In the meantime the young scampered over the water, or swam directly but less hurriedly, toward the marginal growth into which they disappeared.

At Horse Lake on July 26, a female, which when first detected was several hundred yards or so from her brood of eight ten-day-old young, rose from the edge of a rush bed and circled the canoe several times before dropping again to the water. As the canoe continued to advance, the duck again rose and flew directly to her brood where she alighted and led the young birds into the rushes.

Green-winged Teal. *Nettion carolinense.* Young of this species sometimes are concealed in marsh growth or other cover while the female acts in a manner which clearly indicates the presence of young. These actions include short circular flights toward and away from the observer, dropping onto the water or into the marsh growth, and continuous quacking. Two females at Bridge Creek acted thus on July 27; so also at Horse Lake similar behavior was observed on two occasions. In none of these cases were the young found.

At Horse Lake on August 23 a Green-winged Teal's nest was located in a sedge meadow about 100 yards from water. The cup of the nest was six inches in diameter, deep and well lined with down. In and beside it were remains of six eggs, all broken in at the side as if the contents had been removed by crows.

Blue-winged Teal. *Querquedula discors.* During the period from July 24 to August 10 single, or sometimes two or three, eclipse plumaged males, in some cases accompanied by probably non-breeding females, were met with. Later in the season the birds associated in flocks of various sizes which apparently comprised females and flying young. Probably at this time the adult males had moved south. At any rate none was satisfactorily identified.

Females were observed to show great anxiety for the welfare of their young. For example, at 103 Mile Lake a female with four young about two weeks old behaved in the following manner: When approached by canoe she remained with her brood, which first was detected near the center of the lake, until they swam inshore and had hidden themselves in matted filamentous algae. During the shoreward journey of the young

the female flapped over the water toward the canoe several times, and after the young were hidden she followed the canoe with short flights for several hundred yards.

Redhead. *Nyroca americana.* It was observed that female Redheads with broods usually do not remain with their young when disturbed by the presence of man. An exception to this was recorded on July 24, 1936, at Horse Lake where a female with a brood of six well-grown young were under observation. In this case the young scattered into an open growth of rushes while the female flew to open water and preceded the canoe.

Canvas-back. *Nyroca valisineria.* It was common during August to see broods of young, or large bands of young not accompanied by adult females. At this time the females are probably flightless and for this reason less conspicuous, so that in some cases they may have been overlooked. Nevertheless, many cases of unattended young were definitely noted. Thus, at Williams Lake on August 11, one band of forty-two nearly full-grown young, strung out along the edge of the marsh, were examined carefully at close range through binoculars. No females were with, or close to, these young birds.

The relative lack of care shown by females for their young in the case of the Redhead and Canvas-back, as compared with some other species, such as the Lesser Scaup, may have been a factor in the reduction in numbers of these species.

Fig. 48. 105 Mile Lake, Cariboo region, British Columbia.

Lesser Scaup. *Nyroca affinis.* This species proved to be the most common nesting duck in the region adjacent to the Cariboo road, where broods of various ages were met with on all suitable lakes. Concentration of eclipse-plumaged males and non-breeding females also were encountered, 105 Mile Lake being notable in this respect.

This lake is shallow and very rich in animal and vegetable food. There is one small island which is covered with a thick growth of potentillas and vetches. At the west end the lake terminates in a *Scirpus* marsh of about twenty acres extent, in which are channels navigable by canoe. On August 4 and August 8, 1937, the water was clouded with an algal efflorescence and filamentous algae covered parts of the surface. Almost half of the total duck population, which numbered 465 counting adults and young,

were Lesser Scaup. These consisted of eight females with a total of sixty-three young, one-quarter to one-half grown, and a flock of 200 (plus) eclipse-plumaged males and non-breeding females. In addition, on August 4 and 6 a female was flushed from a nest containing eight eggs. As she rose this bird splashed the eggs with excrement of an orange-brown color composed chiefly of the undigested parts of amphipods. Five feet from the occupied nest was a deserted nest containing five addled eggs, and six feet in another direction were three egg shells from each of which the contents had been removed through a ragged hole about three-quarters of an inch wide—evidently the work of crows. Both nests were well concealed by a heavy growth of vetch. The majority in the flock of 200 referred to were males; the remainder probably included both non-breeding adult females and yearling females. By actual count 140 were flightless or nearly so and fifty-two had normal powers of flight. It is of interest to note that at this time (August 4), while most of the non-breeding females were flightless, none of the females with broods had lost the power of flight. At Fawn Lake about two weeks later (August 17), females with broods apparently were incapable of flight.

When the flock at 105 Mile Lake first was seen, the birds were strung along the shore in the shadow of a timbered hillside; visibility was good and it was remarked that many females were in a curious condition of plumage brought about partly by fading and wear. Some had all brown heads, others white cheek patches and a white patch behind either side of the bill; others again had only the latter marking. Some were oddly piebald, both on head and flanks, and some were faded all over the upper surface to the color of tow. One eclipse male and a female, flying and swimming close together, were apparently still mated. Scattered among this raft of birds were adult or yearling female Buffle-heads, Barrow Golden-eyes and broods of Canvas-backs and Lesser Scaups. As the canoe slowly drew nearer to the moving birds, those capable of flight took wing and moved to another part of the lake while the flightless ones dived. In a few minutes these began to break water, some only a few yards away from the canoe. In most cases, after the first dive and reappearance, the birds showed only head or bill above water. For a little time birds were coming to the surface on all sides of the canoe; the number of rings on the water and the faint splashings might have been made by trout. It was remarkable how soon all had disappeared; in a few minutes none save the females with broods could be seen; the molting birds had vanished. This same performance, slightly varied in detail, was again witnessed two days later.

With other species of diving ducks it is common to find young broods unaccompanied by females, but with the Lesser Scaup this appears to be unusual. In nearly every instance where broods were observed, the female remained with her young even when followed closely by a canoe, and in some cases, under these circumstances, she showed lively concern. Thus, at 105 Mile Lake, a female with sixteen young rushed across the water toward the canoe and when close-by turned on her side showing her white underparts and dragging one wing; the bill was held open and a gentle purring note was made continuously.

Two females on a small marshy lake, with broods of seven and eight respectively, showed quite different temperaments. One led her brood along the marshy edge of the lake and made no demonstration of anxiety; the other rapidly approached the canoe, paddling with the feet, beating the water with her wings, and giving the "purring" note repeatedly with the bill held open during and after the sound was made. When twenty yards distant this duck described a circle behind and to one side of the canoe, sometimes surging over the surface with neck outstretched and in a position that brought the white belly into prominence. After this she dived and upon emerging

flapped over the surface as if badly wounded; in the meantime her brood made rapid progress toward the marshy shore.

It is common for several females and their broods to associate in bands which may attract non-breeding females as well. This sometimes takes place even when the young are quite small. Thus at 150 Mile Lake on July 31 a band of seventy young, one-third to one-half grown, and accompanied by seven adult females was under observation. Again at Fawn Lake on August 17 a raft of thirty-nine well grown young and seven females, representing the entire population of this small lake, was sighted at the lake side of a cattail marsh. In close formation they moved along the edge of the marsh and continued thus along the wooded shore of the lake where they were approached by canoe. When only a dozen yards or so intervened, the birds rushed across the surface and then all, including the old females, dived. Apparently at this time the adult females were flightless.

White-winged Scoter. *Melanitta deglandi.* At 105 Mile Lake, on August 4, two broods, and on August 6, a third brood, of this species were examined. In one brood there were fourteen young about one week old, in another, ten slightly older, and in the third, eleven about one-quarter grown. A fourth brood, comprising eleven large downy young, was observed on 103 Mile Lake on August 8. In each case the brood was accompanied by a female.

When the broods were approached close enough to alarm them, the family of ten and the one of eleven were led off in single file, while the family of fourteen followed the female in a closely packed group. Suddenly this entire brood dived almost simultaneously. They reappeared widely separated, paused a moment on the surface, then quickly dived again, so that in a few minutes the brood was scattered over an area approximating an acre in extent. The female showed little alarm and remained close

Fig. 49. Longbow Lake, British Columbia. Bird in the center is a displaying Loon.

to the canoe, swinging her head slowly from side to side and at intervals repeating a soft, tremulous, creaking call. This procedure was observed on two occasions and the female and brood observed at 103 Mile Lake acted in a similar manner. This species hitherto has not been recorded as nesting in British Columbia.

American Coot. *Fulica americana.* Coots were less abundant than was the case during the past few years. A reduction in the numbers of breeding birds was noted in the Cariboo region in the summer of 1934, and it seems probable that any increase which might have taken place subsequently was offset by a reduction which occurred in the early winter of 1935 when in southern British Columbia many coots were frozen in the ice.

Relation of Loons, Coots and Holboell Grebe to Duck Populations.—There is evidence, some definite but mostly circumstantial, that loons attack and sometimes kill the young of other waterfowl. Also it has been observed that loons are sometimes in sole possession of certain small lakes, although conditions there may fulfill the nesting requirements of other water birds. The inference is that in such cases loons, in defense of their nesting territories, have driven other species away. This would appear to be supported by the following observations made in Alberta.

On June 18, 1932, a small lake north of Lacombe, on the Calgary-Edmonton Highway, was occupied by a pair of loons, the only other waterfowl present being a female Mallard, apparently without a brood, and one Holboell Grebe. On May 23, 1933, the loons were absent and the pond was occupied by two pairs of Lesser Scaup Ducks and one pair of Buffle-heads. Another lake close by was, on June 18, 1932, and on May 23, 1933, occupied solely by a pair of loons. A third adjacent slough in the sole possession of one pair of loons on June 18, 1932, and on May 23, 1933, contained a population of nine Lesser Scaup Ducks, one pair of American Golden-eyes, three pairs of coots, two pairs of Holboell Grebes and fourteen Black Terns.

The association between loons and other waterfowl in the Cariboo was watched at every opportunity, with results that are entirely negative. On no occasion was a loon observed to pay attention to any other species of water bird; neither did any of the species under observation show any concern at the presence of loons. At Horse Lake, on July 26, one of a pair of loons which had two young about half grown was kept under observation for some time while it swam toward a female Baldpate and her downy young. The loon was excited by the presence of the observers in a canoe and previously had been diving and splashing on the surface. At this time it continued swimming in a straight line and calling at intervals. The loon and the Baldpate at the head of her brood passed each other at a distance of about ten yards, neither deviating from its course or paying any attention to the other. It may be stated that the Baldpate brood was apparently reduced by three on August 18, when this section of the lake was again visited. There is no evidence, however, that the loons were responsible.

A sharp watch was kept for dead or wounded young ducks which might have been killed by loons or by any other of the species under review, with little result, the only instance being a one-quarter grown Ring-necked Duck (*Nyroca collaris*) on 130 Mile Lake. Evidently wounded, this bird was by itself and after some little difficulty was captured. There proved to be a puncture in the belly close to the anus which may have been made by a loon, although the position of the wound might suggest otherwise. No other young birds, either dead or injured, were found during a careful search in a considerable number of marshes and lakes which were inspected by means of a canoe during the height of the breeding season.

The populations of Holboell Grebes are recorded on the accompanying table. Statements that this grebe attacks young ducks are based, so far as I am aware, merely on the fact of the common use of marsh nesting areas. Observations suggest that a greater mortality takes place in the young of this species than among other waterfowl. They are usually slow-moving, strictly sedentary birds while on their nesting ground, remain-

ing within a definitely limited territory even after the young are fully grown. No evidence of interference with other species was observed.

Unlike Holboell Grebes, coots are pugnacious in the nesting season and sometimes vigorously resent intrusion on their nesting territories by other species. One instance of coots killing young Ruddy Ducks has been reported to me and it seems probable that the destruction of young ducks, or at any rate the dispersal of broods with consequent wandering and loss, does occur on crowded nesting grounds. No instances of this, however, were noted during the course of this study.

In the accompanying table are set forth the populations of young ducks and the numbers of loons, Holboell Grebes and coots occupying the same nesting grounds.

TABULATION OF DUCK BROODS AND ADULT LOONS, HOLBOELL GREBES AND COOTS

Locality	Date Visited	Duck broods	Average in broods	Loons	Holboell Grebes	Coots	Remarks
Pond	July 22	1	3	0	0	2	1 acre slough, rushes
Pond	July 22	4	5	0	0	0	5 acres
Clinton Lake	July 22	11	4.2	0	0	0	50 acres, open shores
Horse Lake	July 23-28	11	6.1	11	10	2	7 by ¼ miles
Unnamed Lake	July 29	7	7.3	0	0	2	50 acres
Pond	July 31	1	7	0	0	4	1 acre, marshy
Pond	July 31	2	6	0	0	2	¼ acre
149 Mile Lake	July 31	22	7.1	0	0	20	10 acres
150 Mile Lake	July 31	10	6.1	0	1	4	25 acres
130 Mile Lake	Aug. 3	8	6.6	2	4	7	1¼ by ¼ miles
105 Mile Lake	Aug. 4	20	8.5	1	14	20	1¼ by ½ miles
108 Mile Lake	Aug. 4	1	3	8	4	4	Unattractive to waterfowl
McKinley Lake	Aug. 6	3	6.1	0	2	12	¾ by ⅛ miles
103 Mile Lake	Aug. 8	6	6.5	0	10	0	¾ by ¼ miles
Elliott Lake	Aug. 8	6	6	0	2	1	⅛ by ⅛ miles
Tatton Lake	Aug. 10	0	....	1	1	8	50 acres, chiefly marsh
Williams Lake	Aug. 11	10	5.5	0	2	30	5 by ¼ to ½ miles
Fawn Lake	Aug. 17	8	6.1	4	0	0	1¼ by ¼ miles
Longbow Lake	Aug. 17	2	2	4	0	0	1¼ by ¼ miles

Correlation of the presence of loons and the mortality among duck broods is suggested by conditions at Longbow Lake (¼ by 1¼ miles) where, with two pairs of loons present, the survival among duck broods (August 17) was four young from two broods. Two other adult female ducks present were not accompanied by young and may have lost entire broods. This lake was relatively poor in duck feed.

Contrasted with this is another smaller lake (50 acres) about two miles distant which was occupied by one pair of loons with one young. There the survival (July 29) was fifty-one young ducks from seven broods. This lake was rich in duck food. The data presented do not indicate a relation between the presence of large grebes and the size of duck broods.

The size of duck broods is not conspicuously influenced by the presence of coots. One of two small marshy lakes (Tatton Lake) was occupied solely by coots and their young except for an adult male Canvas-back. This lake is suitable for ducks, so that the absence of broods and the relatively large number of coots may be significant.

The almost entire monopoly of 108 Mile Lake by loons and grebes is explained by the fact that its waters supply plenty of food for fish-eating birds but very little vegetable food. This applies also to many other Cariboo lakes of the same type.

On any nesting ground even where food and nesting cover are adequate, broods of young ducks, irrespective of their species, are subject to loss. Usually the average of

survival is not greater when loons are absent than when loons are present. The same remarks apply also to the presence or absence of large grebes and coots.

It seems logical to conclude on the basis of these data that the destruction of young waterfowl by loons, Holboell Grebes, or coots does not reach serious proportions. It might be expected that if such destruction commonly took place the evidence would be more decisive. At present such destruction does not appear to be an important factor in the mortality among duck populations, but further investigation of the problem is desirable. There can be no question that the young of waterfowl, including coots and grebes, are subject to reducing factors about which little or nothing is known. The mortality seems to occur more often in the first week or so of life than it does later on. The ability to keep the brood together, and to use hiding places of relative safety during stormy weather, which is possessed in various degrees by ducks of different species and apparently also by different individuals of the same species, probably has an important bearing on the question.

Okanagan Landing, British Columbia, May 5, 1937.

FROM FIELD AND STUDY

Avocets Nesting on San Pablo Bay Marsh.—On May 12, 1934, I took a "nature study hike" with Rev. E. W. Houlding of Benicia, California, driving to the western end of Island No. 1, which lies northwest of Mare Island, where a friend, Chester Curtis, is keeper of a gun club. The club grounds, partly in Solano County and partly in Napa County, lie between the Sears-Point highway, which traverses this island for its eight miles of length, and the Napa Slough.

Mr. Curtis had spoken to me on several occasions, when he visited and shopped in Benicia, regarding a flock of some ten or twelve "white pelicans" which he was of the opinion were nesting just outside of his grounds. He advised that he had seen "young pelicans flying over," and that the flock always returned to, and settled down on, a certain portion of the marsh adjoining his club on the east.

Though we found no evidence that the pelicans were nesting, or had nested, we observed while we waded in the marsh a couple of pairs of American Avocets (*Recurvirostra americana*). As we approached one of the small, grassy islands in the marsh, these avocets vociferously resented our trespassing. I had had experience in the Los Baños marshes with nesting avocets, and a little search disclosed two nests on this island of not over two square rods in extent. Parts of egg shells showed that the eggs had already hatched. Some six feet from one of the nests I located one avocet chick which I estimated was not over two or three days old. It made little or no attempt to get away from us, and I had no trouble in taking the accompanying photo (fig. 50). We noted that the legs seemed rather large for the size of the bird, but when I placed it in the water, the little fellow put these large legs to good use and swam rapidly to the edge of another small island (fig. 51).

Fig. 50. Avocet chick on San Pablo Bay marsh, May 12, 1934.

Fig. 51. Avocet chick swimming. San Pablo Bay marsh, May 12, 1934.

I looked for nesting avocets again in this section in April of 1935 and 1936 without success, there being no birds about except migrants in flocks. Mr. Curtis lets water into his grounds at certain periods and is of the opinion that the land was not flooded early enough to attract them to breed there during these years. They are common during migrations in this area. The "Directory to the Bird-life of the San Francisco Bay Region" by Grinnell and Wythe does not record that the avocet has been found nesting in the San Francisco Bay region.—EMERSON A. STONER, *Benicia, California, September 2, 1936.*

The Black Vulture in Colorado—a Correction.—The collecting of a Black Vulture, *Coragyps atratus atratus,* near Boulder, Colorado, was reported in the Condor in 1922 (vol. 24, p. 26). A recent study of Boulder County specimens in the University of Colorado Museum by Mrs. Charles Moore, then a student in the University, suggested to her that the specimen, which is no. 1426 in the bird series, is a juvenal Turkey Vulture rather than a Black Vulture. Further examination by the undersigned bears out this view. With the endorsement of Professor Junius Henderson, who published the original report, I am, therefore, making this correction. The record should be disregarded, and the species removed from the list of Colorado birds, as its presence on the list was

based upon this specimen. The error was not incorporated in the A.O.U. Check-list (1931), but it is included in the late Dr. W. H. Bergtold's "Guide to Colorado Birds."—GORDON ALEXANDER, *University of Colorado, Boulder, Colorado, March 31, 1937.*

Brown Pelicans Invade Arizona.—The California Brown Pelican (*Pelecanus occidentalis californicus*) has been known as an occasional straggler to Arizona on the basis of two published records. Law (Condor, vol. 26, 1924, p. 153) records one shot at Dos Cabezas, Cochise County, in the fall of 1914 or 1915. Bruner (Condor, vol. 28, 1926, p. 232) saw a flock of nine over Otero Canyon, Baboquivari Mountains, on March 23, 1925.

In June, 1935, Philip Welles, a student of the University of Arizona, flushed a Brown Pelican from a lagoon on the Arizona side of the Colorado River at Laguna Dam. It flew off down the river. In the summer of 1936, Brown Pelicans invaded Arizona in small numbers. In southern Arizona, on June 28, an immature Brown Pelican was found on the grounds of the Arizona School for the Deaf and Blind, at the western edge of Tucson. It was in starving condition and barely able to stand. Some fresh fish was at once procured, and the bird was fed all it would eat. Next morning it was transferred to the University of Arizona aviary and there was exhibited to the interested public for a time. During this period the bird was fed fresh fish twice daily and gained strength rapidly.

On July 14, fresh fish presenting too much of a problem in a desert city, this pelican was freed on Picacho Lake, an irrigation reservoir in the valley 60 miles northwest of Tucson, where White Pelicans (*Pelecanus erythrorhynchos*) have been present for several years in numbers varying from six to one hundred (Condor, vol. 37, 1935, p. 243). Nothing further is known of this individual. At the very point on the shore of the lake chosen for its release, the remains of another immature Brown Pelican were found. This bird had been dead, apparently, for several days.

In northern Arizona, a flock of three Brown and four or five White Pelicans was seen by Mrs. Fred Metz at Mormon Lake, 30 miles south of Flagstaff, on June 7. She was informed that pelicans (doubtless the same flock, as there are no previous summer records of any pelican in the region) had been seen there June 6, also. About June 10, an immature Brown Pelican appeared on the Flagstaff city reservoir, 3 miles northwest of Flagstaff; possibly unable to rise, it remained there until caught by hand, June 15. It was turned over to the Museum of Northern Arizona, but was too weak to save and died the same afternoon. This specimen is now in the collection of the Museum of Northern Arizona.—CHAS. T. VORHIES, *University of Arizona, Tucson, Arizona,* and ALLAN R. PHILLIPS, *Museum of Northern Arizona, Flagstaff, Arizona, April 20, 1937.*

Red-tailed Hawk Choked by Squirrel Skull.—While collecting in the foothills near the old deserted town of Nortonville, Contra Costa County, California, I found a dead immature Red-tailed Hawk (*Buteo borealis calurus*) that apparently had been killed by a mammal skull which had lodged in its throat. The skull was so tightly wedged in the throat that it could not be removed until the skin was cut away. Upon examination the skull proved to be that of the ground squirrel, *Citellus beecheyi.*

Fig. 52. Head of a Red-tailed Hawk killed by the skull of a Ground Squirrel.

When the loose matted hair was scraped from the skull it was found that the squirrel's skull had been in the hawk's stomach for some time and the flesh had been digested from it. The bones of the zygomatic arch had been broken at the middle of the arch and the sharply protruding jugal bones had caught in the sides of the throat.

Those who saw the dead hawk formulated several theories to account for its death. One possibility is that the bird had been shot and had attempted to expel the skull as it died. However, from the way the sharp broken jugal bones were stuck in the throat, it seems improbable that this was the case. Also, the hawk was found in the bottom of a small canyon some distance from any road, trail or habitation.

The most likely theory is that the hawk attempted to expel the skull, and the jugal bones caught in the throat. Of course, it is also possible that the squirrel had been poisoned and that the strychnine had contracted the throat muscles of the hawk, thus stopping the progress of the skull which would otherwise have been expelled with ease. If this were the case and the squirrel had been poisoned, the skull would surely not have remained in the hawk's stomach long enough to have the flesh digested from it, as the strychnine would have caused the hawk's death long before that.

The accompanying photograph (fig. 52) shows the squirrel's skull just as it was found in the hawk's throat and before it was cut out.—LAWRENCE W. SAYLOR, *Department of Entomology, University of California, Berkeley, April 15, 1937.*

Two Unusual Screech Owls.—Strange accidents occur occasionally to birds in flight, and the following incident concerns one of these. On the morning of January 3, 1937, while driving from Marina to Salinas in Monterey County, California, we found a dead California Screech Owl (*Otus asio bendirei*) hanging on a barbed wire fence near Camp Ord. One barb of the fence was hooked through the bird's trachea and one wing was broken, but otherwise the bird was in perfect condition. The freshness of the bird indicated the accident had occurred on the previous night. It is difficult to imagine how a bird with the reputed "night sight" of an owl could "miss" while attempting to fly between the top two wires of a four-wire fence, which were spaced eighteen inches apart.

It is well known that in the absence of normal roosting places, birds occasionally choose strange places to pass their time of rest, but a screech owl turned "billy owl" seems distinctly unusual. Wild Horse Canyon, east of San Lucas, Monterey County, is a region almost, if not entirely, devoid of hollow trees such as are utilized by small owls to rest within during the daytime. It was with some surprise that we found a Pasadena Screech Owl (*Otus asio quercinus*) in an old ground squirrel burrow in the side wall of a barranca in this canyon on the afternoon of January 10, 1937. The bird was secured alive by enlarging the hole and grasping it with a gloved hand.—JACK C. VON BLOEKER, JR., and R. L. RUDD, *Museum of Vertebrate Zoology, Berkeley, February 15, 1937.*

Pacific Golden Plover and Curlew Sandpiper on the Pacific Coast of North America.—While there are many records of shorebird stragglers from the Old World on the Atlantic Coast of North America, those from the Pacific side are comparatively few. Of Old World species taken on the Atlantic side there are records of twelve, excluding all Greenland records; on the Pacific we have only six, excluding all Bering Sea records. This does not imply that there is less chance of an Old World migrant straggling to the Pacific Coast of America; actually there are probably far more of these waifs on the Pacific than on the Atlantic side. But the number of observers who are interested in shorebirds is infinitely less and there is not, nor ever has been, any shooting of shorebirds over decoys in the west. This practice on the Atlantic Coast was productive of many extraordinary records.

During July and August of 1936 a good deal of time was spent by the writer along the north shore of Graham Island, the most northerly of the Queen Charlotte group, British Columbia, in the hopes of recording some of these stragglers. Shorebirds were especially numerous, ten times as many as were seen on a previous sojourn in 1920. But the weather was all against the observer; continuous high winds made the flocks restless and exceedingly wary, so that they rose usually at 100 yards range. At such a distance small distinctions were difficult to make out, even with a good binocular, and shooting at hazard into the large flocks would only mean useless slaughter.

During part of the time the writer had the pleasure of the company of a fellow enthusiast, Mr. A. C. Mackie, but both of us were away on Langara Island for two weeks at the height of the migration. On that island the great numbers of Peale Falcons (*Falco peregrinus pealei*) [forty pairs nest there on 25 miles of shore line] made the study of shorebirds an impossibility.

Pacific Golden Plover. *Pluvialis dominica fulva.* From August 22 to 28, inclusive, small lots of Pacific Golden Plover were seen every day that we were on the beach near Masset; no American Golden Plover were seen then, nor at any time during our stay. All were adults, of which four were taken; three of these are now in my collection and one in Mr. Mackie's collection.

Through the courtesy of Mr. P. A. Taverner, of the National Museum of Canada, I have been able to examine the specimens that might be *fulva* in that collection; three of these are unquestionably *fulva,* the others only brightly colored *dominica.* The latter are frequently seen on the Pacific slope; in fact in all *dominica* from the west the color is consistently yellower than eastern specimens, but not in any way suggesting intergradation with *fulva.* The wing measurement and color of the lower surface, throat, breast and abdomen, can always be relied upon to separate the

two subspecies in juvenal and winter plumages. In summer adults, the wing length alone can be relied on.

There is obviously a considerable migration of *fulva* down the Pacific Coast in the fall, the adults preceding the young as is usual in the Limicolae. Whether this migration is deflected by the prevailing southeast trades to cause it to end up in the Hawaiian Islands is at present only problematical. But the assumption by Wells W. Cooke that all the plover that reach these islands from Alaska take the direct route from the tip of the Alaska Peninsula requires confirmation.

A complete list of Pacific Coast and interior records of *Pluvialis dominica fulva* as known to the writer is as follows:

Comox, Vancouver Island, November 2 and 4, 1903; 5 juveniles taken (not 3 as stated in "A Distributional List of the Birds of British Columbia"). Brooks.

Clayoquot, Vancouver Island, October 16, 1907. W. Spreadborough.

Comox, Vancouver Island, September 15, 1922. H. M. Laing.

Tofield, Alberta, September 9, 1925. C. J. Harrold. These three specimens are all juveniles, typical *fulva* in every respect. National Museum of Canada.

Masset, Queen Charlotte Islands, August 10, 1920, 1 adult. Brooks.

Masset, Queen Charlotte Islands, August 22 and 25, 1936, 4 adults. Brooks and Mackie.

Clallam Bay, Washington, October 28, 1921, 1 juvenile, Carl Lien (A. J. van Rossem, Condor, vol. 38, 1936, p. 217).

San Francisco Bay, California, January 15, 1922, 1 in winter plumage. D. D. McLean (Grinnell, Condor, vol. 38, 1936, p. 219). An examination of all Pacific-Coast-taken Golden Plover will probably show further specimens of *fulva;* a doubtful specimen in worn plumage is in the Museum of Vertebrate Zoology in addition to the one recorded by Grinnell.

Curlew Sandpiper. *Erolia testacea.* On the beach some twelve miles east of Masset, Queen Charlotte Islands, I sighted a Curlew Sandpiper among a large crowd of adult Sanderlings and Western Sandpipers, in the evening of July 31, 1936. All were very restless, but by making a detour and allowing the flock to feed up to me, I was able to collect the stranger. The bird is a male in summer plumage with the first feathers of the winter dress coming in; a very fat bird. Measurements: Wing 124 mm., culmen 34, tarsus 30; now no. 8321 in my collection.—ALLAN BROOKS, *Okanagan Landing, British Columbia, Canada, April 26, 1937.*

A New Race of Brown Towhee, from the Kern Basin of California.—A series of 20 brown towhees in fresh fall plumage, obtained in 1933 from Walker Basin and vicinity, in Kern County, California, present differences from comparable material representing the race *Pipilo fuscus carolae* of the San Joaquin Valley to the northward. In 1935, there appeared the description of a new race of brown towhee from Inyo County, by A. J. van Rossem (Trans. San Diego Soc. Nat. Hist., vol. 8, pp. 69–71). The range of this new race, *Pipilo fuscus eremophilus,* was stated as the "Argus Mountains of Inyo and San Bernardino Counties, southeastern California." Through the courtesy of Mr. van Rossem, we have been able to borrow from the San Diego Society of Natural History, 9 of the Argus Mountains birds he has collected. Comparison of these examples of *eremophilus* with our Walker Basin birds indicates that the specimens from the Kern River drainage basin possess at least one distinctive character, as well as a different combination of other characters. These disclosures justify, we think, the naming of the Kern Basin Brown Towhee as yet another race, which we designate as

Pipilo fuscus kernensis, new subspecies

Type.—Adult male, no. 63969, Mus. Vert. Zool.; 2 mi. N. Sorrell Ranch, 4500 feet altitude, Kelso Valley, Kern County, California; November 29, 1933; collected by R. M. Gilmore, original number 3304.

Subspecific characters.—Color of dorsum somewhat intermediate between that of *carolae* and *eremophilus,* being less brownish and more grayish than in *carolae* and less grayish, more brownish than in *eremophilus;* general tone, below as well as above, grayer than in *P. f. crissalis;* well marked patches of lighter gray on sides of hind neck, these patches tending to meet across dorsum in nape region so as to separate dark brown of crown and occiput from lighter brown of back [in the other races these two areas grade into each other fore-and-aft uninterruptedly]; in size characters, larger than *eremophilus,* especially as to bill, feet and claws, thus comparable with *carolae.*

Measurements.—Of type: Wing, 101.1 mm.; tail, 111.0; exposed culmen, 14.4; depth of bill at base, 9.0; tarsus, 27.4; middle toe without claw, 20.1; chord of hind claw, 11.4.

Range.—Drainage basin of Kern River, within extreme southeastern rim of San Joaquin Valley, in Kern County, California.

Remarks.—Many years ago, A. W. Anthony (Auk, vol. 12, 1895, p. 110) commented on the pallor of a specimen of brown towhee from the South Fork of the Kern River; he suggested that

this was an indication of intergradation with the form *Pipilo fuscus mesoleucus*, the nearest range of which is far to the eastward, in Arizona. Swarth (Condor, vol. 20, 1918, p. 120) attributed the pallor of Kern River specimens chiefly to geographic variation in fading; so he referred all his Kern County material to *carolae*. Grinnell and Swarth (Univ. Calif. Publ. Zool., vol. 21, 1926, p. 429) indicated on their map this same disposition of their Kern County representations. That there can be no significant approach of any of these Californian populations to *mesoleucus* was shown by van Rossem who stated (*op. cit.*, p. 70) that the tendencies in his *eremophilus* are actually away from *mesoleucus*.

The one outstanding feature in the series of *kernensis* viewed as a whole is the presence of the light hind-neck areas, although the character is present in different skins in different degrees of intensity. Only one of the examples in fresh fall plumage does not show this character, an immature male, no. 63280, in molt. The character seems to be entirely lacking in long series of *crissalis* and *carolae*, except in those from the west base of the Sierra Nevada in Fresno County, where intergradation between *carolae* and *kernensis* thus evidently takes place. A few of the Argus Mountains birds possess but faint indications of these patches.

Van Rossem stated (*op. cit.*, p. 69) that the Argus Mountains colony is isolated from the geographically nearest race of brown towhee, *P. f. carolae* as he applied this name, by the Sierra Nevada as well as by intervening deserts. Specimens at hand show that brown towhees occur practically continuously across the faunal divides separating the Kern basin from the Mohave Desert. The general trend observable, toward increasing grayness of the brown towhees of the east side of the San Joaquin Valley, southeastward from the Yosemite region, accentuated in *kernensis* and then culminating in *eremophilus*, points to the probability that the Argus Mountains population itself originated from that of the southern San Joaquin Valley. The series of *eremophilus* at hand shows more uniformity in characters than does the series from the Walker Basin region, perhaps an indication of the effects of the sharper isolation, by the desert interval, in the former case.

On the *west* side of the San Joaquin Valley (though also in Fresno County) we find geographic variation to involve the race *crissalis*. December-taken examples from Priest Valley, in the San Benito Mountain region, have a dorsal coloration that is somewhat intermediate between the characteristic color tone of *crissalis* and that of *kernensis*. There is also shown, very weakly developed, the gray neck patches. Thus we have *kernensis* apparently intergrading with *crissalis* in the extreme southwestern part of the Great Valley.

Incidentally, some recently received material shows that the range of the Oregon race, *Pipilo fuscus bullatus*, extends south into California. A female, no. 67880 Mus. Vert. Zool., taken by David H. Johnson and Fletcher G. Palmer on the Klamath River at 2100 feet, two miles south of Hornbrook, Siskiyou County, May 29, 1935, is fairly typical of *bullatus*, as is male no. 67879, from the south base of Table Rock, 3400 feet, ten miles east of Montague, Siskiyou County, taken by the same collectors May 21, 1935.—Joseph Grinnell and William H. Behle, *Museum of Vertebrate Zoology, Berkeley, California, May 13, 1937.*

Western Tanager Nesting near Cordelia, Solano County, California.—A set of four eggs of the Western Tanager (*Piranga ludoviciana*) was taken by J. Duncan Graham and myself along Green Valley Creek, five miles northwest of Cordelia, in western Solano County, California, on May 23, 1936. The nest was thirty feet from the ground near the top of a maple tree on the edge of the creek. It was not easily discernible from the ground and was located only by the fact that I had thrown a stick against a tall, dead stub adjoining the maple, causing the female tanager to flush and the male to join her. The nest was on the end of a slender limb and required considerable planning and maneuvering with ropes in order to obtain it. It was rather loosely constructed of dry fruit stems of wild grapes, a few dry grasses and weed stems, and tendrils from grape vines; it was lined with a few rootlets. Incubation in the eggs was three to five days advanced.

This is the second record of the breeding of this species in Solano County, the previous record being from the same vicinity by H. W. Carriger and myself (Condor, vol. 34, 1932, pp. 259–260). —Emerson A. Stoner, *Benicia, California, September 13, 1936.*

NOTES AND NEWS

Despite seemingly adequate provision by the United States Department of Agriculture for supplying bird bands, wild birds often are found bearing odd types of band that cannot be identified. Recently, at the south end of Salton Sea, in Imperial County, California, we were given a band taken from a bird, supposed to be a Marsh Hawk, killed in that vicinity within the past year. The band is a metal one with the number 84 stamped on it. If any reader of the *Condor* can supply any clue to the identity of this band, it will be greatly appreciated.—J.M.L.

Wright M. Pierce, member of the Cooper Ornithological Club and of its Board of Governors, died in April of this year. One of Wright Pierce's most outstanding qualities was his desire to help and befriend young naturalists. His spring field trips into the desert region of southern California were high points in the experience of those fortunate to accompany him. Possessed of a keen eye, he could spot a motionless bird or a nest half hidden in the foliage long before most people would catch sight of it. He was careful and precise in making his records, and on collecting trips he was an indefatigable worker in spite of the severe physical handicaps which he endured but to which he never referred. Aspiring youngsters with whom he came in contact appreciated these qualities and tried to emulate them with the result that his influence has in more than one case been perpetuated in the younger generation of ornithologists.—E.L.S., Jr., and A.H.M.

We are so accustomed to human-made structures that hinder the watching of birds that any which have an opposite effect merit special mention. Among the latter type in the San Francisco Bay region the two recently opened bridges and the new approaches to them have already provided some new areas of habitat and increased accessibility to other areas that have been hard to reach in the past. Establishment of the Regional Park in the East Bay hills has opened large acreages of wild land which in the past has been closely guarded against trespassing. With these incentives for more thorough exploration of the region, we anticipate a renewed enthusiasm on the part of naturalists in recording facts of occurrence of birds.—J.M.L.

Fig. 53. The late Wright M. Pierce, long-time member of the Cooper Ornithological Club; author of leading article in this issue of Condor (p. 137); photographed May 28, 1932, in bottomland of Santa Ana River, near Riverside, California, where a nest of Red-bellied Hawk was being visited; one of nest occupants included in picture.

We venture to try another postcard vote of Cooper Club members on a question of the day. The nature of this question is one that surely makes our membership well qualified to express an opinion worth learning. We refer to the moot question, Shall there be legally declared an extended and complete close season on waterfowl (ducks and geese), involving two or more years? The converse question is, Shall there continue to be an open season of more or less duration on waterfowl each year? Each one of us has been flooded with literature advocating one course or the other. Many of the angles have been ably argued, by prominent sportsmen and spokesmen for their organizations, by spokesmen for state and federal agencies, by representatives of conservation organizations, but not so vocally by free-lance ornithologists. The case, we believe, is adequately before us; let's vote, as an expression, each, of his personal judgment in the matter. Therefore will each Cooper Club member send to one or another of the *Condor* editors a postcard on which is indicated unmistakably his present stand. Signature is necessary, so that we may check off names from our membership roster. Out of 900 who might respond, surely there will be enough votes from this specially qualified group to give a fair indication of ornithological opinion. Cards should reach the editors before September 1, so that announcement of results may be made in our September issue.—J.G.

Several agencies have combined their resources in making and publishing an extensive report on "A Survey of the Resident Game and Furbearers of Missouri." This study, under the authorship of Rudolf Bennitt and Werner O. Nagel, was issued in The University of Missouri Studies (vol. 12, no. 2, 1937, pp. 1-215). The kind of inventory represented is needed for every part of the continent, and the need is immediate. The great changes being made in the land not only upset the adjustments of animals and plants to local conditions, but they hinder the accumulation of records such as the Missouri report includes. Apparently the type of investigation begun in this survey is to be extended on a broad basis, for it is announced (p. 194) that a $42,500 wildlife research building has just been completed at the University of Missouri, a 2300-acre experimental tract of land is being developed, and there is already a growing program of wildlife research. How many other states can show as tangible results from activities in behalf of wildlife?—J.M.L.

"A Population Study of the Song Sparrow" which is volume I of "Studies in the Life History of the Song Sparrow," by Margaret Morse Nice, was recently published in the Transactions of the Linnaean Society of New York (vol. 4, April, 1937). It deals with the bird and its environment, its ecology, migration, territory, and reproduction, all from a somewhat statistical point of view, and finally with survival problems. Even though a great deal of the material has been published previously and the major conclusions anticipated, there is a distinct advantage in having all the information gathered in this eight-year study summarized in a single paper. Not only is the history of one colony of song sparrows given in great detail, but correlated information from other studies is cited, so that the work is really a text book of a large share of recent study of birds by banding. One major conclusion epitomizes a valid criticism of theories on population questions—"they all present too much theory based on too few facts. Their authors generalize too much, simplify too much."—J.M.L.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

MARCH.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, March 18, 1937, at 8:00 p.m., in Room 2503 Life Sciences Building, Berkeley, with President Kinsey in the chair and 75 members and guests present. Minutes of the Northern Division for February were read and approved. Minutes of the Southern Division were read. Names proposed for membership were: Miss Kathryn Buchanan, 2620 Durant Ave., Berkeley, by Frances Carter; Allan D. Cameron, 1785 North El Molino, Pasadena, by Frank Richardson; Miss Helen L. Gilliam, 473 Haddon Road, Oakland, by T. Eric Reynolds; Paul Illg, Pinole, California, by Frank Richardson; Alfred L. Killam, 30 Oval Road, Oakland, by Donald S. Brock; Vincent Mowbray, 5052 Fairfax Ave., Oakland, by E. L. Sumner, Sr.; Miss Marjorie Olney, 2720 Elmwood Ave., Berkeley, by William B. Richardson; Thomas L. Rodgers, 1709 Lincoln Street, Berkeley, by Jean M. Linsdale.

Mr. Moffitt spoke a few words in memory of the late Frederic H. Kennard, of Massachusetts, a member of the Cooper Club since 1911.

Mr. Dixon reported on the meeting of the permanent Wild Life Federation at St. Louis, Missouri, March 1 to 4. Forty-one states were represented. Although organization of the federation in California has proceeded slowly, he expressed optimism for its future here.

Field observations were opened by Dr. Harry R. Painton, president of the Stanford Chapter. He told of a field trip with the Audubon Society to Uvas Valley, near Almaden, California, and compared observations with those made by him on a similar trip in 1893. Mr. Moffitt gave a number of observations from Humboldt and Del Norte counties, suggesting that previous scarcity of records from that region might be

attributed to lack of observers. He had noted an abundance of American Mergansers along the Eel River. Mr. Dyer mentioned the presence of this species on the lakes in Mountain View Cemetery, Oakland. He also told of finding a mature Rufous Hummingbird, injured by a cat. The two Anna Hummingbirds kept by him since January were released with considerable difficulty, as they preferred to remain near the abundant food supply in the cages. He further reported numbers of Mockingbirds singing near Niles, Alameda County. Mr. Gordon True had had the good fortune to see a flock of 57 Wood Ducks take flight from a branch of the San Joaquin River near Tracy. Mrs. Stephens reported a Rufous Hummingbird, March 6, in Golden Gate Park, San Francisco, and a male Old-squaw Duck, March 14, at Rodeo Lagoon, Marin County. Mr. Test described reactions of Golden-crowned and White-crowned Sparrows to an albino Golden-crowned Sparrow on the campus.

The speaker of the evening was Mr. Robert T. Orr, of the California Academy of Sciences. His subject, "Observations on the Birds of the Santa Cruz Mountains and Adjacent Coast," covered three years of field work along the southwest-flowing drainage systems of San Mateo and Santa Cruz counties. He described in detail the plant associations found within the several types of habitat, such as redwood, chaparral, willow-cottonwood, marsh and marine. A total of 113 species of birds was recorded. A striking observation was that of Western Mexican Bluebirds along a beach, catching insects above the masses of kelp cast up by the tide.

Adjourned.—FRANCES CARTER, *Recording Secretary.*

SOUTHERN DIVISION

MARCH.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held on Tuesday, March 30, 1937, at 8 p.m., at the Los Angeles Museum, Exposition Park, with President Little in the chair and 42 members and guests present. Minutes of the Southern Division for February were read and approved. Minutes of the Northern Division for February were read by title only. Applications for membership were: John R. Stephens, 166 N. McCadden Place, Los Angeles, and John Baumgardt, 143 N. McCadden Place, Los Angeles, proposed by John McB. Robertson; Alexander H. Kerr, 2146 Kenilworth Ave., Los Angeles, by W. Lee Chambers.

Dr. Loye Miller reported on the recent publication entitled "Vertebrate Animals of Point Lobos Reserve," by Grinnell and Linsdale. George Willett told of seeing an Osprey out on the desert at least fifty miles from water. Dr. Miller told of the birds that he had observed dead on the beaches from Point Mugu southward, and said that he had observed numbers of Cassin Auklets recently, the most that he had seen since the winter of 1908. Mr. J. R. Pemberton reported that Buena Vista Lake was again filling with water, and that there were numbers of water birds there already. Mr. Robert T. Moore reported on the protection given the fauna of the Galapagos Islands by a sanctuary established there.

Dr. W. A. Hilton of Claremont, the speaker of the evening, then showed a series of interesting slides, and told of his visit last year to the Little Barrier Islands off the coast of New Zealand. Many curious birds were encountered, some of them ground birds that were in danger of extinction because of the depredations of the foxes that had been imported from England. The Kea, a ground Parrot, that has formed the habit of killing sheep by eating into their backs to get the kidney fat, and the Kiwi, a flightless ground bird, that has the appearance and habits of a large rail, were especially interesting. Dr. Hilton was unable to see any of them in the wild, due to their nocturnal and retiring habits.

Adjourned.—SIDNEY B. PEYTON, *Secretary.*

APRIL.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at Henley's Camp on Sespe Creek, Sunday, April 25, 1937. Members and guests came in the morning, walked up the canyon to observe birds, and returned to camp for lunch. The business meeting was held at 2:30 p.m. Minutes of the Southern Division for March were read and approved. Minutes of the Northern Division for March were read by title. In the absence of both President and Vice-president, J. R. Pemberton was appointed to preside. Applications for membership in the club were: Milton Boyd Irvine, 626 N. Electric Ave., Alhambra, by John McB. Robertson, and Miss Leno Moll, 3601 Trinity St., Eureka, Calif., by John M. Davis.

J. R. Pemberton reported further on the shooting of hawks and eagles from airplanes and stated that the Department of Commerce and the State Fish and Game Commission, both, had definitely assured him that no permits to carry or discharge firearms from an airplane would be given.

Adjourned.—SIDNEY B. PEYTON, *Secretary.*

TWELFTH ANNUAL MEETING

The twelfth annual meeting of the Cooper Ornithological Club was held in the Life Sciences Building, University of California, Berkeley, Friday, April 16, to Sunday, April 18, 1937. On Friday morning, following the registration of members and visitors, President Eric C. Kinsey of the Northern Division made the address of welcome. Mr. Howard Robertson responded for the Southern Division. A business meeting was called, committees appointed and adjournment taken until Saturday morning.

Papers read at the first session were: Feather Studies on the Condor, by Loye Miller; An Attempt to Measure Bird Damage in Almond Orchards (illustrated), by John T. Emlen, Jr.; The Strategic Place of Birds in Philosophic Natural History, by William E. Ritter; Interspecific Relationships of Thrashers (*Toxostoma*) (illustrated), by William L. Engels; and A Comparison of Behavior of Certain North American and European Shrikes, by Alden H. Miller.

Papers read at the Friday afternoon session were: The Origin and Relationships of the Island Horned Lark, by William H. Behle; The Educational Value of Habitat Groups of Birds and Mammals (illustrated), by William T. Shaw; A New Census Method, by Harold W. Clark; The Effect of a Recent Oil Pollution on Water Birds in the San Francisco Coast Area (illustrated) by Elmer C. Aldrich; Behavior of the Pine Siskin, by Thomas L. Rodgers; Some Observations on the Sierra Nevada Rosy Finch (illustrated), by Howard Twining; Abundance and Food Habits of Raptorial Birds in Cliff Areas of Lava Beds National Monument (illustrated), by Joseph S. Dixon and Richard M. Bond; The Ornithological Work of F. O. Morris and His Relation to Darwinism, by Charles A. Kofoid.

At four o'clock members adjourned to the Museum of Vertebrate Zoology, where "open house" was held, specially prepared exhibits examined, and general collections inspected.

On Friday evening the Board of Governors and Directors met for dinner in the O'Neill Room of the Faculty Club, following which the Annual Business Meeting of the Board was held. (See p. 182.)

On Saturday morning members met at nine o'clock for the adjourned business meeting. Papers following the business session were: Bird Life in Nevada, by Jean M. Linsdale; The White-cheeked Goose in California, by James Moffitt; Voice in the Brown Towhee, by Charles W. Quaintance; Osteological Studies of the Tropical Hawk, *Harpagus*, by Loye Miller; Diseases Found in Wild Birds, by Mary L. Fossler; Adaptations for Tail-support in Birds (illustrated), by Frank Richardson. As on the previous day, luncheon was had at Drake's Restaurant on Bancroft Way, Berkeley.

The afternoon session began with: Some Field and Banding Notes on Texas Nighthawks (illustrated), by Charles H. Feltes; followed by: Cliff Swallows at the Life Sciences Building, by Joseph Grinnell; Flightless Birds of the Mascarene Islands (illustrated), by the Marquess Hachisuka and Dr. G. D. Holwerda; The Wintering of White-throated Swifts in Alum Rock Park, by Gayle B. Pickwell; Soil Conservation and Wildlife, by Floyd H. Wymore; The Flycatchers of the Yosemite Region (imitated vocally), by Charles A. Harwell; and Bird Observations in Tierra del Fuego (illustrated), by Ynes Mexia.

On Saturday evening the annual dinner was held for members and their guests at Hotel Durant, with 114 persons in attendance. At the appropriate time, President Kinsey designated George Willett to serve as toastmaster. In lighter vein the latter called in turn on a dozen of those oldest in point of membership for brief reminiscences. All the responses were eagerly listened to, but no other with more attention than met that of Dr. Harry R. Painton, President of the Stanford Chapter, and one of the four young enthusiasts who founded the Cooper Ornithological Club forty-four years ago. Following the talks, there were two reels of motion pictures of birds in the mountains of eastern California by James B. Dixon, and a reel of the Sandhill Crane in Utah and Idaho by Dr. John W. Sugden.

On Sunday morning, a goodly number of the members met at 6:30 a.m. for an all-day field trip, planned for seeing shorebirds at the height of their migration through the San Francisco Bay region. A fine variety of species seen was reported by mid-afternoon, when those who took the trip joined less sturdy members at the California Academy of Sciences in Golden Gate Park. Here, Mrs. James Moffitt and Mrs. Robert T. Orr assisted Mr. Joseph Mailliard, Honorary Curator of Birds, in receiving the guests, while Mr. Moffitt, Curator of Ornithology and Mammalogy, and Mr. Orr, Assistant Curator of Mammalogy, showed specimens of the shorebirds which had been observed. A delicious tea was served by Mrs. Moffitt and Mrs. Orr.

Record is here made of the services of the very efficient committee which arranged all the many details of the meeting under the able chairmanship of William H. Behle.—HILDA W. GRINNELL.

GOVERNOR'S MEETING

The Sixteenth Annual Meeting of the Board of Governors of the Cooper Ornithological Club was held in the O'Neil Room of the Faculty Club, University of California, at Berkeley, California, April 16, 1937. The meeting was called to order at 8:00 p.m., with President George Willett in the chair, and the following members present: Clinton G. Abbott, Louis B. Bishop, H. W. Carriger, Frances Carter, W. Lee Chambers, J. S. Cooper, Joseph S. Dixon, Hilda W. Grinnell, Joseph Grinnell, Eric C. Kinsey, Alden H. Miller, Loye H. Miller, Sidney B. Peyton, Gayle B. Pickwell, Guy C. Rich, Howard Robertson, John McB. Robertson, Tracy I. Storer, George Willett, and Curtis Wright. Proxies were presented as follow: J. S. Appleton, Ralph Arnold, H. L. Coggins, Harry Harris, John G. Tyler, by Laura B. Law; Harold C. Bryant, W. K. Fisher, Joseph Mailliard, Harold Michener, by Joseph Grinnell; R. B. Cowles, by Loye H. Miller; Luther Little, by George Willett. Mrs. Guy C. Rich was present as a guest. Dr. Harry S. Painton, one of the

four original founders of the Cooper Ornithological Club, was also present as a guest, and when introduced by President Willett he gave a short reminiscence of the "fledgling" days of the Club.

Minutes of the fifteenth Annual Meeting were read and approved. Report of the Auditing Committee that the Business Managers' accounts for 1936 had been examined and found accurate was read and accepted on motion by Loye H. Miller, seconded by Guy C. Rich.

The Business Managers' report was submitted by John McB. Robertson. The year 1936 started with a balance of $1,609.09 on January 1, and ended with a balance of $2,677.80 on December 31. Pacific Coast Avifauna No. 23, "The Birds of Nevada," by Jean M. Linsdale, and No. 24, "Birds of the Charleston Mountains, Nevada," by A. J. van Rossem, were published during the year; and donations had been received from several members toward the cost of publishing during the coming year Avifauna No. 25, "The Natural History of Magpies," by Jean M. Linsdale. A gain of 38 new members and subscribers was made for the year. One Life Membership was received and the $75.00 placed in the Endowment Fund. In this connection, the importance that Life Memberships play in earning interest for the benefit of the Club was emphasized by the Business Managers with the hope that more Life Members may be secured during the coming year.

The Chair appointed as Auditing Committee for 1937: Messrs. J. R. Pemberton, chairman, J. S. Cooper, and Luther Little.

The report of the Editors of the Condor was submitted as three separate reports. (1) The statistical accounting, presented by Joseph Grinnell, dealt with the last complete volume of the Condor, Volume XXXVIII, for 1936. Punctuality in appearance of the magazine was stressed, and the methods by which punctuality is attained, "with urgence to hurry," were given in interesting and enlightening detail. The 1936 edition of the Condor was 1350 copies, of which 1089 were mailed on date of publication, and the balance held for future sales. In the nature of a stimulative effect toward "greater or improved effort and achievement," a comparison between weights per volume and number of words per volume was made with the Auk. (2) Insurance of variety of content and interest to readers of the Condor was discussed by Alden H. Miller. Selection is necessarily limited by the kind of articles on hand, and, because the Condor has a following in both professional and amateur groups, the content of the magazine must be balanced to maintain values for both. The editors believe a fair balance is now attained, but critical comment was invited on the present set-up. (3) J. M. Linsdale submitted for consideration by the Board of Governors the following subjects: (a) The printing of reviews of current ornithological works; (b) the maintenance of exchanges; (c) the new features to be introduced for the first time in Pacific Coast Avifauna No. 25, such as topic, colored frontispiece, full tone reproductions for some of the illustrations, and copies bound for a small extra cost. It was moved by Loye H. Miller, seconded by Guy C. Rich, that the three reports of the Editors be adopted as read. Louis B. Bishop asked that the motion be amended to include the appreciation and thanks of the Board of Governors to the Editorial Staff. The amended motion was carried unanimously.

The Chair called for discussion of the suggestion regarding the printing of reviews of current ornithological works. After considering this from many viewpoints, it was moved by Loye H. Miller, seconded by Howard Robertson, and duly carried, that for reviewing in the columns of the Condor the editors be requested to give preference to articles on western ornithology.

President Willett spoke of the recent death of Wright M. Pierce and asked Clinton G. Abbott and Alden H. Miller to prepare resolutions of sympathy for transmittal to Mrs. Pierce, and instructed the secretary to record said resolutions as part of the minutes of this meeting. The adoption of this procedure was moved by Howard Robertson, seconded by Tracy I. Storer, and unanimously carried. The following resolution was drawn up:

"Our meeting has been saddened by word that has just reached us of the passing, on April thirteenth, of one of the most beloved members of our group, Wright M. Pierce. Always a prominent and active member of the Cooper Club, Wright Pierce was, only a year ago, Chairman of the Arrangements Committee for the Annual Meeting. His genuine love of birds, his tireless enthusiasm in the field, his generous and hospitable nature, his surpassing skill as a wild-life photographer, and above all, his genial and sympathetic personality, will never be forgotten as long as there remains upon this Board a single member who had the privilege of counting Wright M. Pierce among his friends. Therefore,

"BE IT RESOLVED, That the Board of Governors of the Cooper Ornithological Club do hereby express our great sorrow at the death of Wright M. Pierce, and that we enter this resolution upon the minutes of this meeting and send a copy of it to Mrs. Pierce, together with an expression of our deepest sympathy in her great bereavement."

Recalling the death of George M. Wright in February, 1936, C. B. Lastreto requested that a copy of the resolutions passed at the Fifteenth Annual Meeting of the Board of Governors be given to him for transmittal to Señor George Melendez, of San Salvador, the uncle of Mr. Wright. This request was seconded by Alden H. Miller, and it was duly carried.

The Chair read correspondence from Professor W. T. Shaw, of Fresno State College, inviting the Cooper Ornithological Club to hold its next annual meeting in Fresno. This invitation was

accepted, and the secretary was requested to forward to Professor Shaw the appreciation and acceptance of the Board of Governors, with the request that when selection of the Fresno local committee is made, the Northern Division of the Cooper Club be advised of its personnel. It was moved by Loye H. Miller, seconded by Louis B. Bishop, that the Board of Directors of the Cooper Ornithological Club appoint a committee to work with the Fresno local committee, and that the Northern Division of the Club assume responsibility for the scientific part of the program. This motion was unanimously carried.

Adjourned.—LAURA B. LAW, *Secretary.*

ANNUAL MEETING OF THE COOPER ORNITHOLOGICAL CLUB, INCORPORATED

The business session was called to order in Room 4505, Life Sciences Building, University of California, Berkeley, California, at 9:30 a.m., April 16, 1937, with President Howard Robertson presiding and George Willett acting as Secretary.

The President appointed, as a committee to examine proxies, John McB. Robertson, Chairman, John T. Emlen, Jr., and Frank Richardson, and, as a nominating committee to present nominations for Directors for the ensuing year, Loye Miller, Chairman, Henry W. Carriger and J. S. Cooper.

The following were nominated for membership in the Club: Elizabeth M. Over, by Dale Arvey; Douglass H. Hubbard, Andrew McLain, and Dr. Leo F. Hadsall, by W. T. Shaw; Berton F. Jones, by Brighton C. Cain; and Mrs. Alice Quick and Lawrence W. Saylor, by Jean M. Linsdale.

On motion made, seconded and duly carried, the meeting then adjourned to meet in Room 2503, in the same building, at 9:00 a.m., April 17, 1937.

The adjourned business session was resumed at 9:00 a.m., April 17, 1937, in Room 2503, Life Sciences Building, University of California, Berkeley, California, with President Howard Robertson presiding. George Willett acted as Secretary.

The Proxy Committee reported that, of a total membership of 876, 85 members were present in person and 419 were represented by proxies. The Chairman therefore declared a quorum present.

The Nominating Committee reported the following nominations for Directors for the ensuing year: Howard Robertson, W. Lee Chambers, John McB. Robertson, J. R. Pemberton, Joseph Grinnell, Laura B. Law, Alden H. Miller, Jean M. Linsdale and George Willett. On motion made, seconded and duly carried, the nominations were closed and these Directors were declared elected.

A unanimous vote of appreciation was tendered the Arrangements Committee of the Northern Division of the Club for their management of the meeting.

The following names were presented for membership in the Club: Mrs. Dorothy C. Hartshorne and Mr. John H. Applegarth, by Wilbur V. Henry, and Mrs. Chas. B. Andrews, by Mrs. G. Earl Kelly.

The meeting adjourned at 9:30 a.m.—GEORGE WILLETT, *Secretary.*

DIRECTORS' MEETING

A meeting of Board of Directors of the Cooper Ornithological Club, Incorporated, was held in Room 411, C. C. Chapman Building, 756 South Broadway, Los Angeles, California, at 7:30 p.m. on Friday, April 30, 1937, with President Howard Robertson presiding and George Willett acting as secretary. The following members of the Board were present: W. Lee Chambers, Laura B. Law, J. R. Pemberton, Howard Robertson, John McB. Robertson, George Willett.

The following officers were elected for the ensuing year: President, Howard Robertson; Senior Vice-President, Alden H. Miller; Junior Vice-President, J. S. Cooper; Secretary, George Willett; Assistant Secretary, Hilda W. Grinnell; Treasurer, John McB. Robertson; Business Manager, W. Lee Chambers; Editor, Joseph Grinnell; Associate Editors, Jean M. Linsdale and Alden H. Miller.

The minutes of the last meeting of the Board, and of the 1937 Annual Meeting of the Corporation, were read and approved.

Eleven new members were elected to the Corporation, from and including Kemuel Anderson, No. 948, to and including Lovett Thomas Turner, No. 958. Resignations were accepted from Mrs. Herbert Brown, Genevieve S. Burk, Miriam S. Faddis, Mervyn Annis Ortez, and Walter Raymond Salt. George R. Walker and Alfred Cookman were dropped from the roll for nonpayment of dues.

The Treasurer reported the following members deceased since the last meeting of the Board: Mrs. Percival B. Coffin, F. H. Kennard, Wm. A. Strong, and Wright M. Pierce.

The Treasurer and Business Manager were authorized to rent and have control of a safe deposit box in the Security-First National Bank of Los Angeles.

The Business Manager announced the presentation to the Club by Mrs. Harry S. Swarth of one egg of the California Condor, from the Morcom collection (originally from the Taylor collection); complete sets of the Nidiologist and the Condor, bound, and volumes I, II, and III of the Condor, unbound. A unanimous vote of thanks was tendered Mrs. Swarth for her generosity.

Adjourned.—GEORGE WILLETT, *Secretary.*

For Sale, Exchange and Want Column.—Each Cooper Club member is entitled to one advertising notice in any issue of The Condor free. Notices of over ten lines will be charged for at the rate of 15 cents per line. For this department, address JOHN McB. ROBERTSON, Buena Park, California.

FOR SALE—Twelve remaining sets of Dawson's "The Birds of Washington," 2 vols. (1909); at prices ranging from $10.00, without plates, to $50.00 for perfect de luxe set.—MRS. WM. LEON DAWSON, *2708 Puesta del Sol Road, Santa Barbara, California.*

WANTED—One copy each of "The Biota of the San Bernardino Mountains" by J. Grinnell, and "An Account of the Birds and Mammals of the San Jacinto Area" by Grinnell and Swarth.—E. R. EDGE, *San Bernardino Junior College, San Bernardino, California.*

FOR SALE—The following copies of The Condor: 1925, nos. 2, 3, 4, 5, 6; 1926 to 1931, complete volumes; 1932, nos. 1, 2, 3, 5, 6; 1933 and 1934, complete volumes; 1935, nos. 1, 2, 3, 4, 5; 1936, complete volume. Will make special price for any or all numbers.—GRETCHEN L. LIBBY, *61 East Las Flores Drive, Altadena, California.*

WANTED IN EXCHANGE—North American Faunas, 2, 13, 25, 33, 38, and 45. Offer equivalent values in the following duplicates: Nos. 3, 8 (lacks cover), 29, 30, 32, 34, 35 (lacks cover), 37, 39, 42, and 44; or many early Biological Survey bulletins.—JAMES MOFFITT, *1879 Broadway, San Francisco, California.*

FOR EXCHANGE—Thirty volumes of The Auk, unbound, for skins of common California birds.—H. L. COGGINS, *1157 Filbert St., San Francisco, California.*

FOR SALE—The Auk, fourteen volumes, 1903-1916; fair condition; $18.00. Birds of North and Middle America by Robert Ridgway, 8 vols., paper covers as issued, mostly uncut; fine condition; $25.00. North American Land Birds, 3 vols., Baird, Brewer and Ridgway, Boston, 1905, 64 colored plates; as new; $20.00. Life Histories of North American Birds, Bendire, 2 vols., 1892 and 1895, 4to, one volume, original cloth binding the other in original wrappers; good condition; $14.00. The Condor, vols. 4 to 30, 1902-1928 inclusive; show considerable use and are somewhat soiled but are complete and good working volumes; early volumes are rare; the lot, 26 volumes, $20.00.—W. LEE CHAMBERS, *2068 Escarpa Drive, Eagle Rock, California.*

FOR SALE—Several sets of each of the following: A.O.U. Nos. 3, 7, 11, 13, 27, 30, 31, 32, 34, 35, 36, 37, 40, 42, 47, 71, 86, 119, 130, 135, 136, 138, 148, 149.1, 152, 154, 155, 159, 171.2, 222, 223, 229, 235, 243, 253.1, 267, 271, 275, 353, 358.1, 486a, 534, 694, 698, 760, 675a. All sets are A1, and with full data. —WILLIAM F. PALSSON, *Hallorsstadir, Laxardal, via Husavik, Iceland.*

WESTERN BIRD-BANDING ASSOCIATION

W.B.B.A. Two-compartment Trap, has wire bottom and may be used as a gathering cage. In the United States, west of Mississippi River,.....$1.50 postpaid
East of the river, and in Canada,.....$1.75 postpaid

New W.B.B.A. Government Sparrow Trap; in the United States, west of the Mississippi River,.....$4.50 postpaid

East of the river, and in Canada,.....$5.00 postpaid
This trap is always set; when birds come in flocks, traps them to the limit of its capacity.

Hoffmann's Birds of the Pacific States,.....$5.00 postpaid

WESTERN BIRD-BANDING ASSOCIATION, Museum of Vertebrate Zoology, Berkeley, California